EFFECTIVENESS OF SENSORY INTEGRATION TO REDUCE NEGATIVE SYMPTOMS AND TO IMPROVE FUNCTIONAL ABILITIES IN SCHIZOPHRENIC PATIENTS

DISSERTATION SUBMITTED

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THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY

CHENNAI

CERTIFICATE

CERTIFICATE

This is to certify that the research work entitled **"EFFECTIVENESS OF SENSORY INTEGRATION TO REDUCE NEGATIVE SYMPTOMS AND TO IMPROVE FUNCTIONAL ABILITIES IN SCHIZOPHRENIC PATIENTS"** was carried out by Reg. No. 411612001, KMCH College of Occupational Therapy, towards partial fulfillment of the requirements of Master of Occupational Therapy (Advanced OT in Mental Health) of the Tamil Nadu Dr. M.G.R. Medical University, Chennai.

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ACKNOWLEDGEMENT

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OBJECTIVE:

The purpose of this study is to find the effectiveness of sensory integration to reduce negative symptoms and to improve functional abilities in schizophrenic patients

METHOD:

30 schizophrenic patients with negative symptoms, with an age group of 20-60 years were selected and they were conveniently assigned into experimental and control groups. Each group consist of 15 subjects. Subjects were evaluated at the beginning and end of treatment with Adult Sensory Profile, Scale for the Assessment of Negative Symptoms and Specific Level of Functioning Assessment. Sessions lasted for 45 min to 1 hour. Statistical analyses were performed using 't' test and independent 't' test.

RESULT:

The statistical analyses showed that there was a significant reduction in the negative symptoms and also improvement in the functional abilities of the patients with schizophrenia.

CONCLUSION:

The result helps to conclude that sensory integration is an effective treatment in reducing the negative symptoms and improving the functional abilities of patients with schizophrenia. It also encourages the use of sensory integration therapy in adult population as it is cost effective and has better recovery.

KEY WORDS:

Schizophrenia, Negative Symptoms; Sensory Integration; Cognitive Remediation.

INTRODUCTION

INTRODUCTION

Prevalence of schizophrenia is about 0.3% - 0.7%. Schizophrenia is recently categorized into two as non-deficit schizophrenia characterized by negative symptoms and deficit schizophrenia characterized by positive symptoms [(1)]. It usually begins in early adolescence, has a chronic course and has variable outcomes. People with schizophrenia show decreased likelihood of living independently, maintaining relationships, achieving education or getting employed [(12)].

Negative symptoms are responsible for more disability in schizophrenia. These factors also contribute to decrease in psychosocial functioning. Negative symptoms are observed in more than 50% of the patients with schizophrenia. The etiology and pathophysiology of negative symptoms are generally less amenable to treatment. Negative symptoms also increase the duration of the hospital stay[(3)]. Based on the suggestions from some work, it is seen that negative symptoms are inversely correlated with functional outcomes[(4)].

Environment is rich in sensory stimuli and people with schizophrenia have difficulty in processing these stimuli. Sensory integration is a way to explain and describe behavior. It explains why a person behave and respond in certain ways such as why a person is bothered by labels in clothes, won't eat certain textures of food or have difficulty standing in crowds[(21)]. Sensory integration theory provides a framework for treatment. Treatment emphasizes the processing of sensory input, especially tactile and vestibular-proprioceptive, coupled with demand for an adaptive motor response to integrate the input. Certain treatment reflects the basic tenets of sensory integration with children. It is not the same as skill building, or cognitive strategies training[(21)].

Jean King has linked sensory integration to schizophrenia and her works helped many occupational therapists to use sensory integration as a treatment for adults with psychiatric illness[(2)]. Her theory proposes that schizophrenic patients have defective proprioceptive feedback mechanisms along with vestibular component being both under reactive and underactive, which results in poor subcortical integration of sensory stimuli and inadequate feedback information necessary for normal development of all other perceptual-motor systems. This hypothesis was

supported by many studies showing that schizophrenic individuals have abnormal vestibular reactivity and also by empirical observations of posture, movements, muscle tone and general behaviour in the non-paranoid schizophrenic patient population[11]. King specified few elements while planning sensory integration treatment for schizophrenic patients. She also advices to use group treatment as it is cost-effective and also patients can learn from each other and feels that a therapist and one assistant can work effectively with a group of six to ten patients. King suggests that existing space (dining room or day room) can be utilized by moving the furniture and by making the patient move it, as it provides heavy work and proprioceptive feedback for the patient and also states that minimal equipment are needed[21].

A study conducted by Dennis P, et.al reported that functioning of higher cognitive processes are prevented in schizophrenia, because of this thinking is distorted i.e. the information which reaches the higher brain centers are incomplete or inaccurate even though they have normal higher cognitive process. Information processing was hypothesized into many stages such as conscious perception followed by iconic stage and speed of information processing. Iconic storage is hypothetically seen as the preconscious input facility of the nervous system that is capable of detecting, registering and transiently storing very large amounts of information. Iconic stage occurs immediately after sensory detection. For example when a stimulus is presented briefly and terminated, even before conscious perception, all the information about the stimulus will be available in the iconic storage but the individual is unaware of this until these information's are transferred to higher brain function. There are limits in the rate of transfer of information from iconic stage and the information is not transferred until the iconic decompensates are lost. Studies support that there is a disturbance in schizophrenia during the first few hundred milliseconds of processing have generally reported results that are consistent with deficits in either iconic storage or slow information processing from iconic storage to more permanent memory system[23].

Studies on schizophrenic patients also suggest that they have an inability to filter irrelevant information, have low registration and also prefer environment with low demands. Negative symptoms may or at least in part, be a response to the disturbance of psychosis and cognitive arousal. Asociality and blunted affect may be represented as counteractive responses to environmental stimuli[5]. Based on Ayres

and King, sensory integrative treatments are subcortical in nature and stimulate the vestibular, auditory, proprioceptive, tactile, visual and olfactory systems[11].

Sensory integration is the process of cognitive neuropsychology (1).Ayres defined sensory integration as "the organization of sensory input for use. The 'use' may be a perception of the body or the world, or an adaptive response, or a learning process, or the development of some neural function"[9]. It was identified as one of the effective treatment methods.

NEED FOR THE STUDY:

- Schizophrenia is often a lifelong illness associated with high rates of morbidity and disability, affecting their performance in independent living, relationship maintenance and achievement in education or employment[12].
- Negative symptoms are generally less amenable to treatment. Negative symptoms also increase the duration of the hospital stay[3].
- Negative symptoms have greater negative impact on cognitive functioning of the patient[21].
- One of the effective treatments is the use of sensory integration therapy[1].
- Only few studies are available on this topic[1].
- Sensory integration is a cost-effective treatment and equipment needs are minimal[21].

RESEARCH QUESTION

- Will sensory integration help in reducing the negative symptoms and improving functional abilities of schizophrenic patients?

OPERATIONAL DEFINITION

OPERATIONAL DEFINITION

Negative Symptoms: affective flattening, poverty of speech, loss of drive and malfunctioning of social and interpersonal relationships.

Sensory Integration: it is a cognitive neuropsychological process in which sensory data from the environment are received, processed, results in providing appropriate responses and adaptive behaviour.

Cognitive Remediation: The goal of cognitive remediation therapy is to improve the cognitive functions and also the ability to generalize the improved function by providing a behavioural training intervention[22].

AIMS AND OBJECTIVES

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AIM

- To find the effectiveness of sensory integration in schizophrenia in reducing negative symptoms and improving their functional ability skills.

OBJECTIVES

- To reduce the negative symptoms using sensory integration.
- To find how reduction in negative symptoms improves the functional abilities in schizophrenia.

HYPOTHESES

HYPOTHESES

NULL HYPOTHESIS

Sensory integration provided to patients will not reduce negative symptoms and will not improve their functional abilities.

ALTERNATIVE HYPOTHESIS

Sensory integration provided to patients will reduce negative symptoms and this will improve their functional abilities.

RELATED LITERATURE

RELATED LITERATURE

SCHIZOPHRENIA

It is a disorder with "many different faces" (Andreasen, 2001). The most common symptoms of schizophrenia will include changes in the way a person thinks, feels, and relates to other people and the outside environment. Schizophrenia is officially defined by various combinations of psychotic symptoms in the absence of other forms of disturbance, such as mood disorders, substance dependence, delirium or dementia.

Schizophrenia is a devastating disorder for both the patients and their families. It disrupts many aspects of the person's life, decreases their quality of life in terms of both subjective satisfaction and ability to compete. It also has great impact on society, among the mental disorders, it is the second leading cause of disease burden. After the onset of schizophrenia, many people do not return to expected levels of social and occupational adjustment.

Schizophrenia has been categorized into three phases: prodromal, active and residual. The slow development of signs and symptoms before the diagnosis occurs in prodromal phase. Active phase is seen by the presence of schizophrenia usually with positive symptoms. The final phase is the residual phase, during this active symptoms are controlled and remaining symptoms are negative. After diagnosis patients fluctuate between the residual and active phases, sometimes positive symptoms never completely resolve and patients remain in active phase. Some schizophrenic patients remain in the residual phase throughout the course of the illness[16].

SYMPTOMS

The symptoms can be divided into three dimensions: positive symptoms, negative symptoms and disorganization (Lenzenweger, 1999).

- Positive symptoms
- Negative symptoms
- Disorganization

VULNERABILITY MARKERS FOR SCHIZOPHRENIA

- **Working Memory Impairment:** Many studies reported that schizophrenic patients have impaired ability to perform laboratory tasks that usually involving the central executive component of this working memory. Working memory problems are more stable and do not fluctuate in schizophrenic persons.
- **Eye-Tracking Dysfunction:** when people with schizophrenia were made to track the motion of the pendulum or similar oscillating stimulus while the person's head is kept in static position. Instead of smooth-pursuit eye movement schizophrenic persons showed frequent interruptions by numerous rapid movements

TREATMENT

- **ANTIPSYCHOTIC MEDICATION**: Medications are divided into first generation of drugs (1950s) are also called traditional or classical antipsychotics and second generation drugs (1990s) are also known as atypical antipsychotics as they are less likely to produce motor side effects when compared to classical antipsychotics. Chlorpromazine (Thorazine) is a first generation drug and was successful in treating chronic psychotic patients. The second generation antipsychotic includes risperidone (Risperdal), olanzapine (Zyprexa), quetiapine (Seroquel), etc. These atypical antipsychotics are less likely to produce tardive dyskinesia and are also useful in maintenance treatment to reduce the risk of relapse. These drugs have good effects on positive symptoms and the bad news is that these are less effective in treating negative symptoms.
- **PSYCHOSOCIAL TREATMENT:** Many interventions are proved to be effective and these treatments usually focus on long term strategies rather than resolution of acute psychotic episodes. Procedures include family oriented after care, social skill training, assertive community treatment, cognitive therapy and institutional programs.

SENSORY INTEGRATION

Sensory processing is the ability of a person to register and modulate sensory information and to organize this input to respond to situational demands. Sensory processing difficulties can occur in some or all sensory systems and are expressed by extreme behaviours in response to sensory systems and are ranging from hypersensitivity to hyposensitivity , from sensory seeking to sensory avoidance behaviours[18]. Dunn's (1997) model of sensory processing describes the patterns consistent with the supersensitivity and overinhibition constructs. Based on this model the responses to sensory experiences are organized across two dimensions into four quadrants. One dimension is low versus high neurological threshold. The other reflects behaviours that match versus counteract the threshold. Individuals with low threshold require less stimulation for sensation to be perceived and to receive a quick response (super sensitivity). In contrast, individuals with high neurological thresholds require more stimulation and thereby are more likely to miss sensory cues (overinhibition). The other quadrant differentiates between responses that are in accord with threshold level versus those that serve to counteract it. Resulting quadrants are sensory sensitivity (irritability and distractibility with sensation) and sensory avoiding (responses to counteract a low neurological threshold).

Modulation is an important aspect in the process of sensory integration, by which the nervous system balances the person's level of arousal with the intensity of stimuli experienced. It's an internal thermostat which cues one when to arouse or to calm oneself. When there is a sensory integrative problem, the person's internal capacity to modulate is affected. Vestibular and tactile information processing deficits are found in children and adults with schizophrenia, substance abuse, also with persons with post-traumatic stress disorder. Sensory integrative problems can have a major impact on the person's autonomy, independence and mastery of new skills. Hitting, smashing or throwing things can be related to hypersensitivities. Mood regulation problems can be found in people with combination of both hypo and hypersensitivities, can be often noticed in bipolar disorder. The person with sensory integration problem will have difficulty in self-soothing and needs others help to remind them about it.

An integration of data from a broad spectrum of studies reports that sensory sensitivity, sensory avoiding and low registration are common responses in schizophrenic population. Sensation avoiding in schizophrenia is characterized by the appeal of predictable and low demand environments together with presence of negative symptoms[5].

Sensory integration is a framework first described by occupational therapist A. Jean Ayres, PhD, in the 1970s. It refers to the body's way of handling and processing sensory inputs from the environment. Based on Ayres and King, sensory integrative treatments are subcortical in nature and stimulate the vestibular, auditory, proprioceptive, tactile, visual and olfactory systems[11].

COGNITIVE REMEDIATION THERAPY (CRT)

Psychiatric conditions are commonly accompanied with cognitive deficits and sometimes these can be the core features of these disorders. Cognitive remediation can also be called as cognitive rehabilitation but some experts claims that intervention that are general refers to cognitive rehabilitation and interventions that are developed to specific etiologies refers to cognitive remediation. Cognitive remediation is based on neuroplasticity (neurobiological process by which learning and environmental factors alter cognitive processing). The goal of cognitive remediation therapy is to improve the cognitive functions and also the ability to generalize the improved function by providing a behavioural training intervention[22].The definition was updated in 2012 as "an intervention targeting cognitive deficits using scientific principles of learning with ultimate goal of improving functional outcomes". Cognitive remediation helps to stimulate new learning or relearning of cognitive tasks and therefore improves cognitive deficit. This therapy is to engage patient in learning activities that improve neurocognitive skills relevant to their recovery goals.

Cognitive remediation programs vary in implication method, area focused and complexity. Example some programs are administered individually and some in groups. Basic cognitive abilities such as attention and memory were focused traditionally and latest approaches are directed towards higher level executive functions such as social cognition.

Eack (2012) proposed principle components of cognitive remediation for schizophrenic individuals: (1) **strategic:** developing cognitive strategies to complete tasks; (2) **drill and practice**: repetition of strategies until performance noted; (3) **hierarchical**: tasks graded from simple to complex; (4) **cueing**: use of external aids to support cognitive abilities; (5) **fading**: gradual removal of external aids to increase the task difficulty; (6) **adaptive:** adjusting the difficulty of cognitive tasks to keep it interesting and challenging; (7) **anchoring**: linking the learned skills to real-world behaviours; (8) **integrating with other treatment methods:** using remediation along with other treatment to increase the possible benefits.

REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION:

TMS was developed in 1980's to study about the functioning of the brain. In this procedure a magnetic field is created and passed through the skull which creates a current in the brain and this current activates the nearby nerve cells. A coil of wire s wrapped in a plastic and is held to the head while a capacitor discharges the magnetic field. Researchers found that repeated application of TMS over a period of several days showed changes in the brain activity. The magnetic field can be targeted to any specific region of the brain where the nerve cells are associated with the psychiatric symptoms. Recent studies on the use of repetitive TMS reported that it had promising reduction of negative symptoms of schizophrenia. Other studies also showed reduction of positive symptoms.

ELECTROCONVULSIVE THERAPY:

It is a medical procedure in which seizures are induced in patients by giving electrical shock through the electrodes that are attached to the scalp. During brief procedures, anesthesia is administered. Mortality rate is about 2 deaths per lakh treatments and also has anesthesia complications. It is mainly used for treating symptoms that are resistant to other treatments. Studies report that it has short-term benefits in global functioning when used in conjunction with antipsychotic medication. Side effects may include short term memory loss about 1-2 weeks or confusions immediately after administration.

MINDFULNESS INTERVENTIONS FOR SCHIZOPHRENIA:

It generally focuses on facing the present-moment experiences rather than to use avoidance or suppression to cope up with unwanted experiences. Qualities encouraged in mindfulness are to be nonjudgmental, no reactivity, detachment, acceptance and compassion among others. The aim of this is to make the patient aware of the symptoms which they are experiencing.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Jinoos Jadidi, and Mina Sadat Mirshoja conducted a study to describe the impact of the sensory integration approach on positive and negative symptoms in patients with non-paranoid schizophrenia. The treatment involved eight sessions held 3 days a week and lasting 45 minutes each. The patient had a defined Iranians form social relationships schizophrenia evaluated and treatment. Sensory integration therapy in these patients focused on the following elements: vestibular and proprioceptive senses, exercises to improve walking, improving upper extremity coordination and movement, writing activities, cognitive skills, activities of daily living, and family therapy. The subject (A.H.) was a 32-year-old male graduate student with no history of previous hospitalization. His diagnosis was schizophrenia. After eight sessions, increased awareness of the environment, improved posture and gait pattern, improved motivation and enjoyment, improved patient tolerance, improved appearance and personal hygiene, loss of purposeful behavior, a realistic plan of action every day, improved attention span, improved decision-making skills, and improved community involvement and coping skills were achieved. The environment is rich in sensory stimuli. The integration and processing of each individual senses creates different behavioral responses. The results showed that a sensory integration approach combined with drug therapy is an effective treatment for patients with schizophrenia.

Isa Levine, Helen O'Connor, Beverley Stacey were conducted a pilot study at the Douglas Hospital Center of Montreal in 1975 to determine whether stimulating the sensory integrative processes of the central nervous system would effect any behavioral changes in non-paranoid schizophrenics. Based on the theory of Lorna Jean King, the paper delineates the plan of the study, the testing battery developed for evaluating patients, and the program of activities utilized during the project. The results of the pilot study reveal that a correlation seems to exist between sensory integrative functioning and the behavior of chronic non-paranoid schizophrenics.

Rashmi Patel, Nishamali Jayatilleke, Matthew Broadben, conducted a study using novel automated method to identify negative symptoms in the clinical records of a large sample of patients with schizophrenia using natural language

processing and assess their relationship with clinical outcomes. The study concluded that negative symptoms were common and associated with adverse clinical outcomes, consistent with evidence that these symptoms account for much of the disability, admission and readmission, and also increases duration of the hospital stay for the patients with schizophrenia. Natural language processing provides a means of conducting research in large representative samples of patients, using data recorded during routine clinical practice.

Jonathan Rabinowitz, Stephen Z. Levine, George Garibaldi, did a study to find the relative effects of negative symptoms on functioning, as compared to other symptoms, using data from the National Institute of Mental Health CATIE trial of chronic schizophrenia by examining correlations of Positive and Negative Syndrome Scale factors, Calgary Depression Rating Scale and select items from Heinrich's and Lehman's Quality of Life Scales measuring aspects of functioning that did not overlap with negative symptoms. The data suggests that negative symptoms are more strongly correlated with functioning than the positive symptoms and also shows that improving negative symptoms will improve functioning.

Catana Brown, Rue L. Cromwell, Diane Filion conducted a study to find the possible coexistence of supersensitivity and overinhibiition in schizophrenia was studied using the Adult Sensory Profile. Individuals with schizophrenia, bipolar disorder and mentally healthy people were compared. Results showed that schizophrenic patients tend to miss the available stimuli and when stimuli were detected, they were avoided.

Judith E. Reicman and Anne B. Blakeney concluded a study that there was a need for further efficacy studies in this area and for the development of standardized tests of sensory integrative status in adults. In the absence of such a tool, Crist (1979) was not able to quantify changes in body image using a modification of the Goodenough Harris Draw-a-Man Test. However, she reported many subjective observations of improved ability to function in the treatment group as well as a decrease in some of the characteristics of sensory integrative dysfunction. As the investigator stated, without standardized measurement tools, these observations can only be used as indicators of areas for future research.

Bailey (1978) focused on the effect of sensory integrative treatment on increasing verbalizations in chronic schizophrenics, an observation reported by King (1974) and other therapists (Blakeney, Strickland & Wilkinson, 1983). While Bailey's study lends partial empirical support to increased verbalizations following sensory integrative treatment, her study showed that sensory integrative activities improved the quality of life in non-paranoid schizophrenic patients but had less effect on rate and quality of speech.

Paola Rocca, Cristiana Montemagni, et.al conducted a study to find the effect of negative symptoms on everyday functioning in schizophrenic patients. The Personal and Social Performance scale and Quality of Life scales were used. The results suggest that the negative symptoms have a greater correlation with functional outcomes.

Armida Mucci, Paola Rucci, et,al. conducted a study to find construct validity, internal consistency and factor structure of "The Specific Level Of Functioning Scale". It was conducted on 895 Italian people with schizophrenia and was analysed by means of multitrait-multimethod approach. Results suggested that SLOF is a reliable and valid instrument for the assessment of social functioning and it also has good construct validity and internal consistency.

Shantala Hedge, Shobini L.Rao, Ahalya Raguram performed a study to find the effectiveness of a 2-month-long home-based cognitive remediation program together with treatment as usual on neuropsychological functions, psychopathology and global functioning in patients with first episode schizophrenia. Data suggested that there is improvement in neuropsychological functions of divided attention, concept formation and set-shifting ability and planning.

CONCEPTUAL FRAMEWORK

CONCEPTUAL FRAMEWORK

SENSORY INTEGRATION

King hypothesized that person diagnosed as having chronic schizophrenia have deficits in their reception or processing of proprioceptive and vestibular information and that these sensory integrative deficits contribute to or perhaps even cause the psychotic symptoms.

King also postulated that these schizophrenic patients are unable to move fluidly because they have an ineffective proprioceptive feedback mechanism, the most important component which is an underactive or underactive vestibular regulating system, i.e. the person with schizophrenia cannot, at subcortical level, effectively use sensory information regarding his or her own position and this inability leads to restrictive, protective movement.

By limiting the movements, the individual tends to exacerbate the problem by decreasing vestibular and proprioceptive input. Having to think about moving slows the person, and movement loses its fluidity. This tends to interfere with the individual's ability to engage in normal physical activity, this ultimately lessens their comfort in social situation and increases withdrawal.

An integration of data from a broad spectrum of studies reports that sensory sensitivity, sensory avoiding and low registration are common responses in schizophrenic population. Sensation avoiding in schizophrenia is characterized by the appeal of predictable and low demand environments together with presence of negative symptoms

The aim of this study is to provide sensory integration therapy which helps the patients to process the sensory stimuli there by resulting in reduction of negative symptoms and improving their functioning abilities

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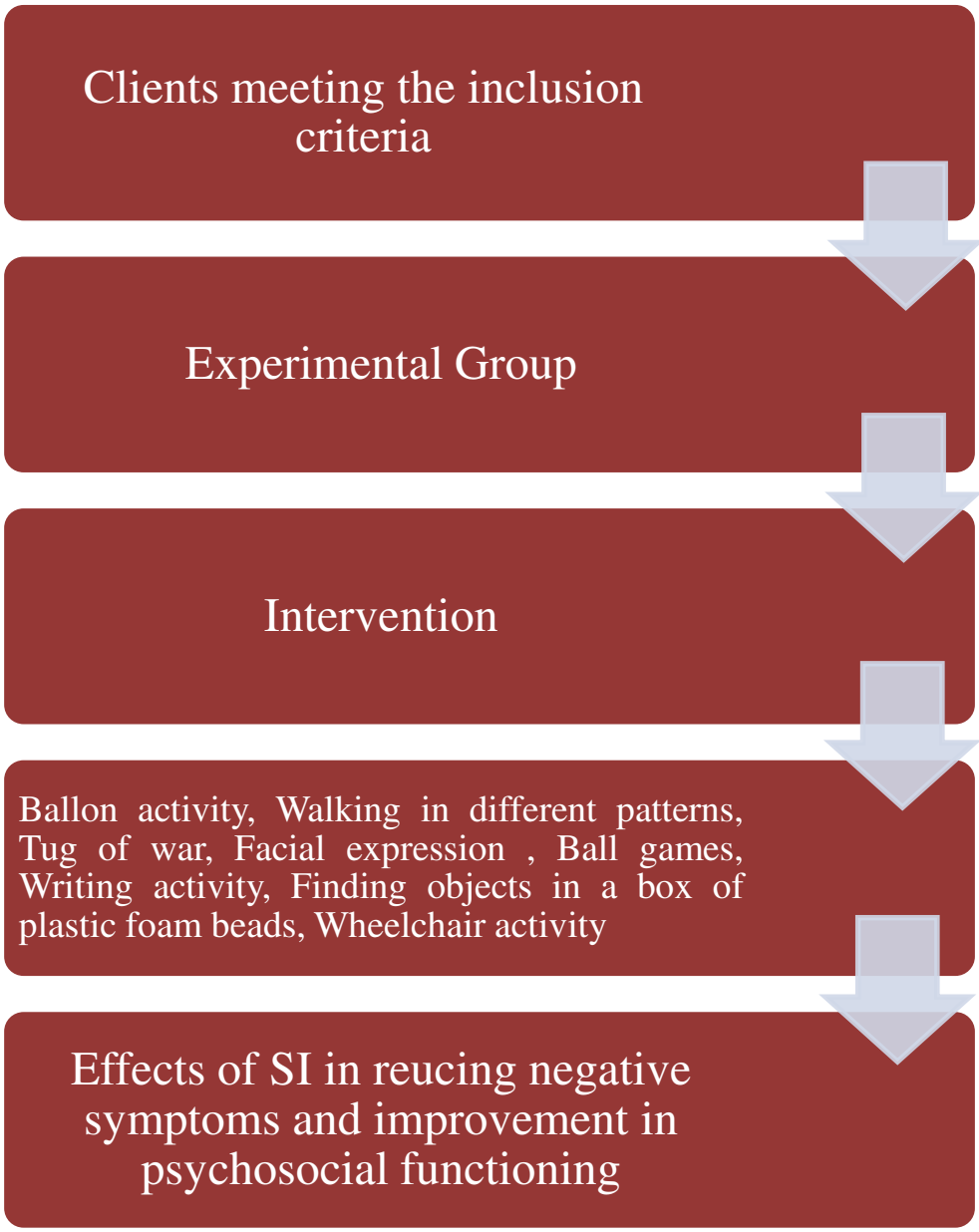

Clients meeting the inclusion criteria
Experimental Group
Intervention
Ballon activity, Walking in different patterns, Tug of war, Facial expression , Ball games, Writing activity, Finding objects in a box of plastic foam beads, Wheelchair activity
Effects of SI in reucing negative symptoms and improvement in psychosocial functioning

MATERIALS AND METHODOLOGY

MATERIALS AND METHODOLOGY

RESEARCH APPROACH:

- An experimental approach was adapted to assess the effectiveness of sensory integration in reducing negatives symptoms and improving functional abilities in schizophrenic patients.

RESEARCH DESIGN:

- The present study was two groups pre-test and post-test is a quasi-experimental study design.
- The diagrammatic representation of the design is as follows:

Experimental Group 1 = Q1 ----------X1 ----------Q2

Control Group 2 = Q1 ----------X2 ----------Q2

Where, Q1 = pretest

Q2 = posttest

X1 = Sensory Integration

X2 = Cognitive remediation therapy

VARIABLES UNDER THE STUDY:

- Dependent : Negative symptoms and functional abilities
- Independent : Sensory integration and cognitive remediation
- Extraneous : Environment, availability of patients during therapy session.

SETTING AND DURATION OF INTERVENTION:

- This study was conducted at KMCH department of occupational therapy, Naveen Mental Hospital, Krishna Nursing Home and Kongunadu Mananala Arakattalai. The duration of intervention was 2 months.

POPULATION OF THE STUDY:

- Clients diagnosed with schizophrenia and showing negative symptoms.

CRITERIA FOR SAMPLE SELECTION:

Following criteria's were adopted for the selection of samples.

- **INCLUSION CRITERIA:**

  Patients with Schizophrenia

  - Age group between 20 – 60 years.

  - Minimum duration of 2 years

  - With negative symptoms.

  - With SANS score of 30

- **EXCLUSION CRITERIA:**

  - Schizophrenic Patients with positive symptoms.
  - Patients with head injury, deficit with neurocognition.

SAMPLE SIZE:

The sample size was 30.

SUBJECT:

Experimental Group 1(SIT) = 15 subjects
Control Group 2 (CRT) = 15 subjects

SAMPLING TECHIQUES:

The subjects were selected according to the selection criteria and they were randomly assigned to the experimental and control groups.

MEASUREMENT TOOLS:

- **ADULT SENSORY PROFILE:**

  It is based on the Dunn's model of sensory processing and is a self-reporting tool used to find the responses to sensory experiences. The scale has 6 items divided into four quadrants such as Low Registration, Sensation Seeking, Sensory Sensitivity and Sensory Avoiding. Participants indicate how often they respond to the sensory event using a 5-point Likert scale (1-almost never to 5-almost always). The result scores range from 5 to 75 and the results are divided based on age criteria like 11-17years, 18-64years, 65 and older. The questioner has good validity, internal consistency with coefficient alpha values: for sensory seeking-0.81, sensory sensitivity-0.82, for low registration-0.86 and for sensory avoidance 0.85 (18).

- **SPECIFIC LEVEL OF FUNCTIONING:**

  It includes 43 items that are divided into six subscales namely Physical Functioning, Personal Care Skills, Social Acceptability, Activities of Community Living and Work Skills. These are scored on a 5-point Likert Scale (1-poorest functioning to 5-best functioning) describing the frequency of behaviour and /or patient's level of independence. The study conducted on 895 Italian people with schizophrenia reported that SLOF is reliable and valid instrument for the assessment of social functioning. It also has good construct validity and internal consistency and a well-defined factor structure (19).

- **SCALE FOR THE ASSESSMENT OF NEGATIVE SYMPTOMS (SANS)**

  The SANS is a rating scale to measure negative symptoms in schizophrenia. The scale was developed by Nancy Andresen and was first published in 1984. SANS is split into 5 domains, and within each domain separate symptoms are rated from 0 (absent) to 5 (severe).

INTERVENTION:

This study was conducted at KMCH Department of Occupational Therapy, Naveen Mental Hospital, Krishna Nursing Home and Kongunadu Mananala Arakattalai between the periods of October 2017 to December 2017. A total of 24 sessions were conducted for both the experimental and control groups. Sessions were conducted thrice a week. Each session for both the groups lasted for 45min to 1 hour. The details are given in appendix –

DATA ANALYSIS

DATA ANALYSIS

Paired t test of SANS and SLOF between Experimental and Control Group

TABLE 1.1 Pre-test and Post-test of SANS and SLOF between Experimental and Control Group

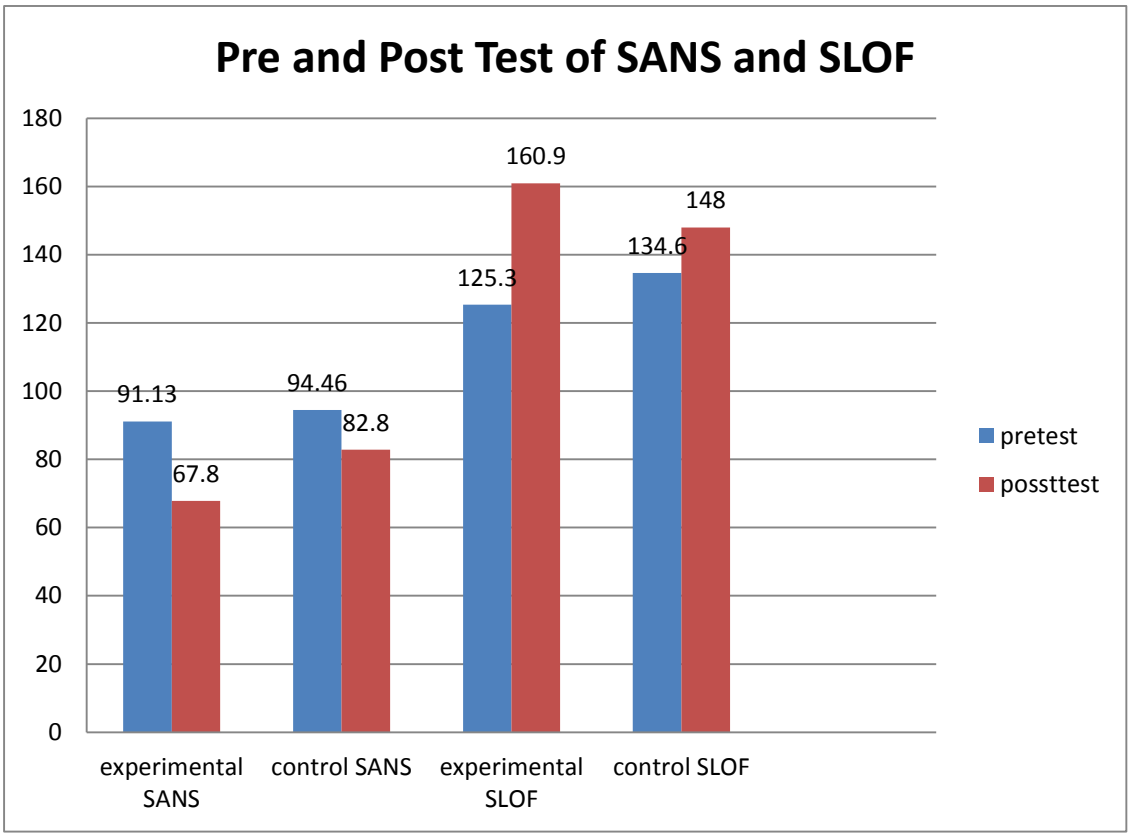
GROUPS	SCALES	MEAN Pre test	MEAN Post-test	SD Pre test	SD Post-test
Experimental Group	SANS	91.13	67.8	8.06	13.01
	SLOF	125.3	160.9	22.59	21.09
Control Group	SANS	94.46	82.8	14.09	12.95
	SLOF	134.6	148	21.32	21.94

TABLE 1.2 Paired t test of SANS and SLOF

GROUP	SCALES	Paired Difference							
		MEAN Difference	SD	Std. Error Mean	t	df	Sig. (2-tailed)	Lower	Upper
Experimental Group	SANS	23.33	7.306	1.886	12.36	14	.000	19.28	27.37
	SLOF	35.6	9.708	2.506	14.202	14	.000	40.97	30.22
Control Group	SANS	11.66	4.77	1.233	9.461	14	.000	9.02	14.31
	SLOF	13.4	9.470	2.445	5.480	14	.000	18.64	8.15

The table 1.2 shows that there is reduction in negative symptoms and increase in functional abilities within the experimental and control group based on the paired difference between the pre and post-tests.

GRAPH 1


Pre and Post Test of SANS and SLOF
180
160
140
120
100
80
60
40
20
0
91.13
67.8
94.46
82.8
125.3
160.9
134.6
148
experimental SANS
control SANS
experimental SLOF
control SLOF
pretest
possttest

Independent t test of SANS and SLOF between Experimental and Control Group

TABLE 1.3

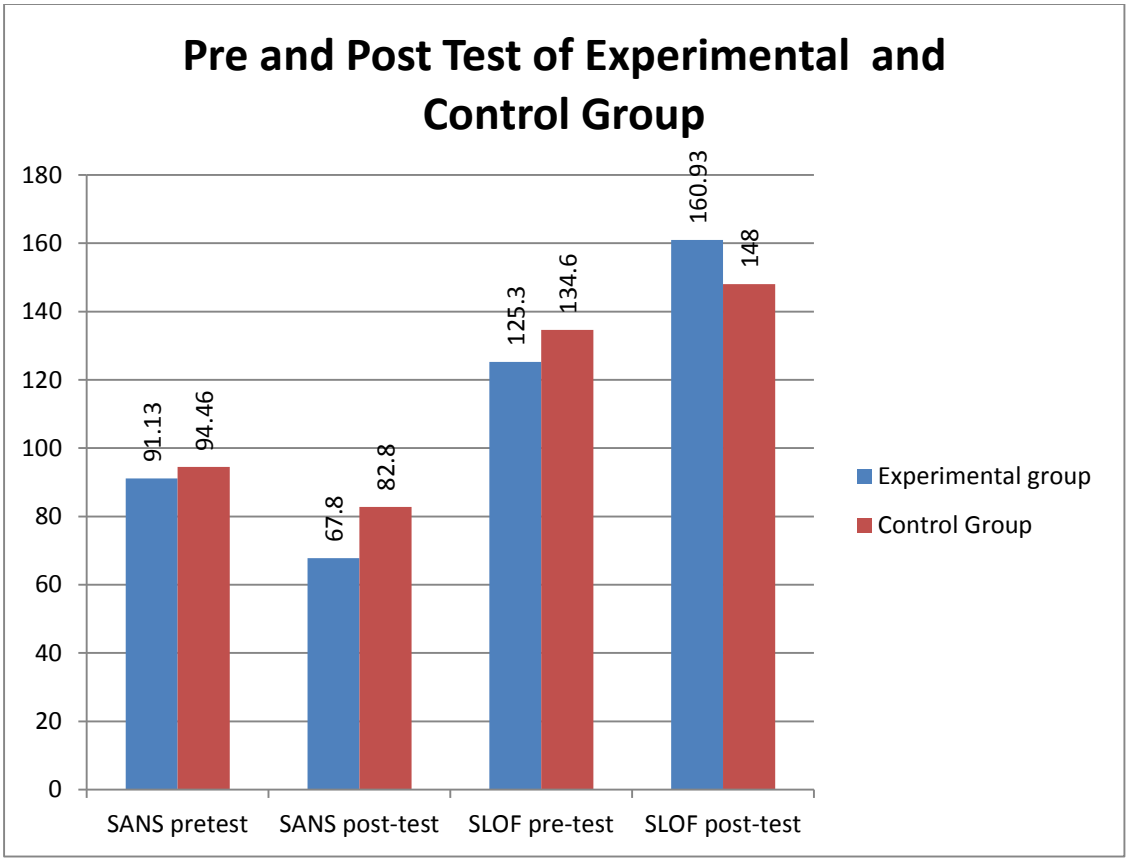
SCALES	GROUPS	MEAN Pre test	MEAN Post-test	SD Pre test	SD Post-test
SANS	Experimental Group	91.13	67.8	8.609	13.01
	Control Group	94.46	82.8	14.09	12.95
SLOF	Experimental Group	125.3	160.93	22.59	21.09
	Control Group	134.6	148.0	21.32	21.94

TABLE 1.4

SCALES		MEAN (Difference)	Std. Error Difference	t	df	Sig. (2-tailed)	Lower	Upper
SANS	Pre	3.33	4.26	.782	28	.441	12.06	5.40
	Post	15.00	4.74	3.16	28	.004	24.71	5.28
SLOF	Pre	9.26	8.02	1.15	28	.258	25.69	7.16
	Post	12.9	7.85	1.64	28	.111	3.16	29.03

Table 1.3 and 1.4 shows the mean value of pre and post test scores of experimental group have marked reduction in negative symptoms and increase in functional abilities. But the mean value of pre and post test scores of control group shows only a mild reduction in negative symptoms and increase in functional abilities. This shows that experimental group has significant difference when compared to control group

GRAPH 2


Pre and Post Test of Experimental and Control Group
180
160
140
120
100
80
60
40
20
0
91.13
94.46
67.8
82.8
125.3
134.6
160.93
148
SANS pretest
SANS post-test
SLOF pre-test
SLOF post-test
Experimental group
Control Group

Paired t test of individual components of SANS between Experimental and Control Groups

TABLE 2.1

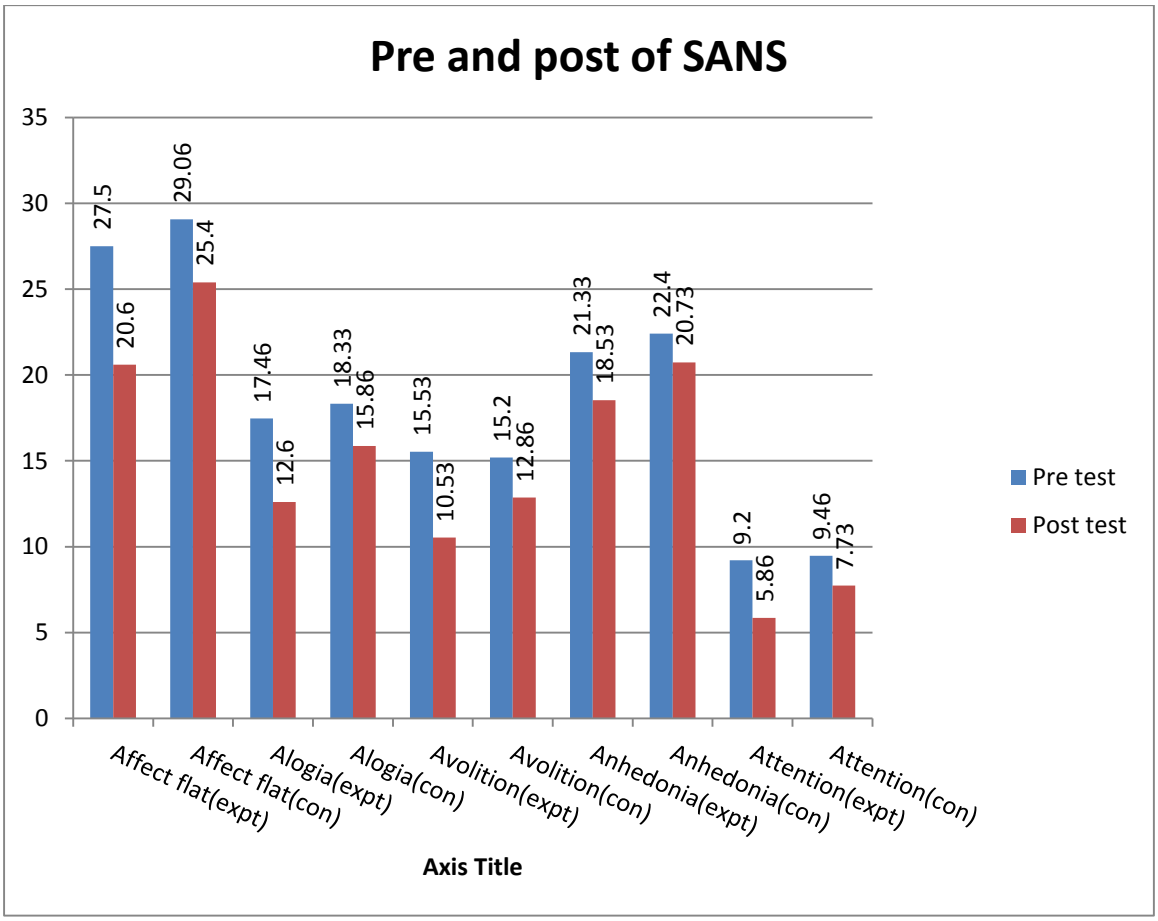
GROUPS	SCALE	VARIABLES	MEAN Pre test	MEAN Post-test	SD Pre test	SD Post-test
Experimental Group	SANS	Affective Flattening	27.5	20.06	5.026	4.589
		Alogia	17.46	12.6	3.06	3.08
		Avolition	15.53	10.53	2.77	3.94
		Anhedonia	21.33	18.53	1.87	2.35
		Attention	9.20	5.86	2.36	2.47
Control Group		Affective Flattening	29.06	25.4	4.43	4.53
		Alogia	18.33	15.86	3.28	3.22
		Avolition	15.20	12.86	3.004	2.64
		Anhedonia	22.40	20.73	2.29	2.05
		Attention	9.46	7.73	2.69	2.43

TABLE 2.2

GROUP	SCALES	VARIA-BLES	Paired Difference							
			MEAN (Difference)	SD	Std. Error Mean	t	df	Sig. (2-tailed)	Lower	Upper
Experimental Group	SANS	Affective Flattening	7.466	3.181	.821	9.089	14	.000	5.70	9.22
		Alogia	4.866	2.06	.533	9.125	14	.000	3.72	6.01
		Avolition	5.0	2.699	.696	7.174	14	.000	3.50	6.49
		Anhedonia	2.80	1.97	.508	5.501	14	.000	1.70	3.89
		Attention	3.333	2.41	.622	5.356	14	.000	1.99	4.66
Control Group		Affective Flattening	3.666	1.397	.3607	10.163	14	.000	2.89	4.44
		Alogia	2.466	1.767	.456	5.405	14	.000	1.48	3.44
		Avolition	2.333	1.496	.386	6.041	14	.000	1.50	3.16
		Anhedonia	1.666	.975	.251	6.64	14	.000	1.12	2.20
		Attention	1.733	1.387	.358	4.840	14	.000	.96	2.50

Table 2.1 and table 2.2 indicates that there is a reduction in symptoms in all the component of SANS in both experimental and control group but not up to a significant level.

GRAPH 3


Pre and post of SANS
35
30
25
20
15
10
5
0
27.5
20.6
29.06
25.4
17.46
12.6
18.33
15.86
15.53
10.53
15.2
12.86
21.33
18.53
22.4
20.73
9.2
5.86
9.46
7.73
Affect flat(expt)
Affect flat(con)
Alogia(expt)
Alogia(con)
Avolition(expt)
Avolition(con)
Anhedonia(expt)
Anhedonia(con)
Attention(expt)
Attention(con)
Axis Title
Pre test
Post test

Independent t test of individual components of SANS between experimental and control groups

TABLE 2.3

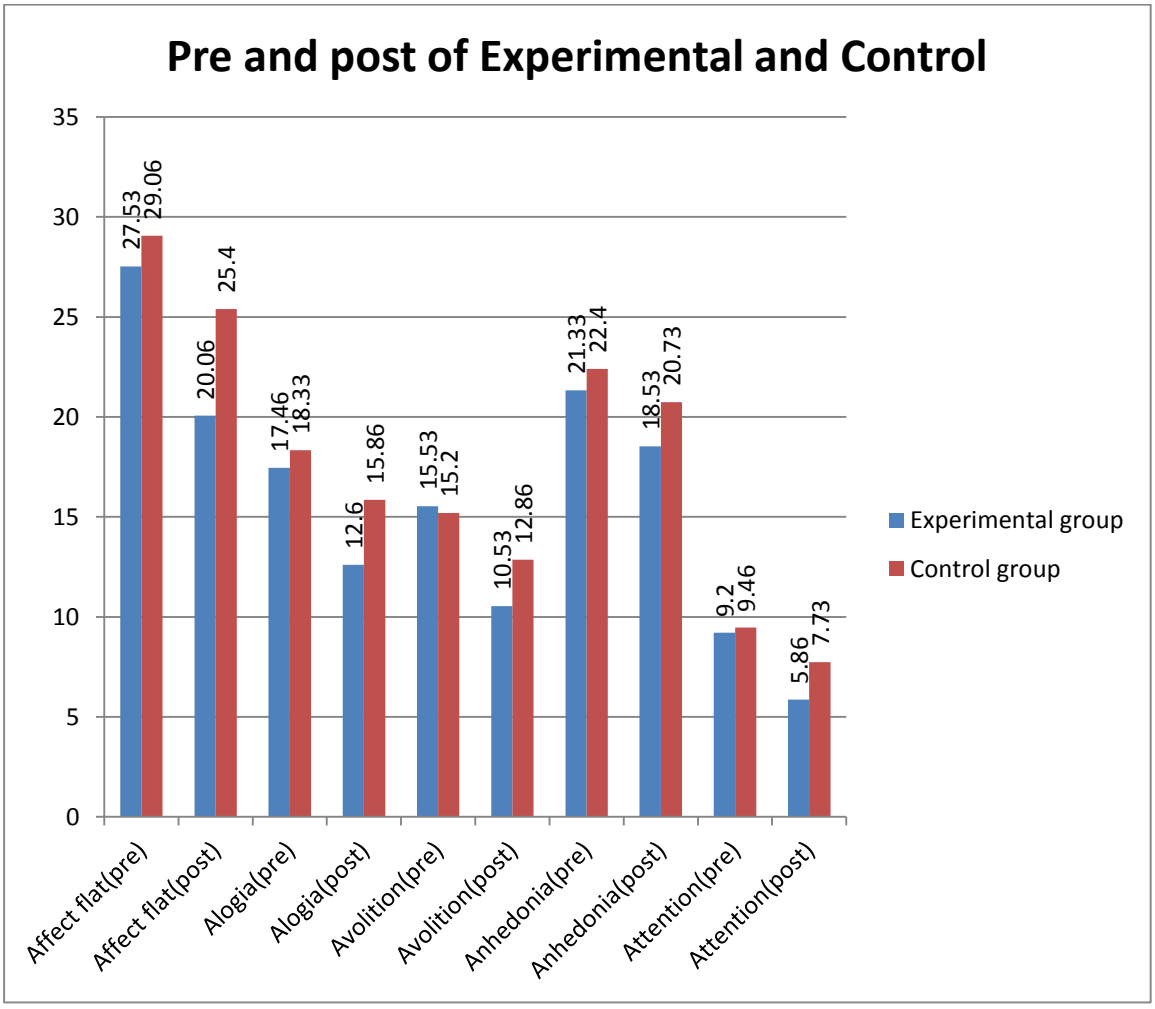
VARIABLES	GROUPS	MEAN Pre test	MEAN Post-test	SD Pre test	SD Post-test
AFFECTIVE FLATTENING	Experimental Group	27.53	20.06	5.02	4.58
	Control Group	29.06	25.4	4.43	4.53
ALOGIA	Experimental Group	17.46	12.60	3.06	3.08
	Control Group	18.33	15.86	3.28	3.22
AVOLITION	Experimental Group	15.53	10.53	2.77	3.94
	Control Group	15.20	12.86	3.00	2.64
ANHEDONIA	Experimental Group	21.33	18.53	1.87	2.35
	Control Group	22.40	20.73	2.29	2.05
ATTENTION	Experimental Group	9.20	5.86	2.36	2.47
	Control Group	9.46	7.73	2.69	2.43

TABLE 2.4

Variables		MEAN (Difference)	Std. Error Difference	t	df	Sig. (2-tailed)	Lower	Upper
AFFECTIVE FLATTENING	Pre	1.53	1.73	.886	28	.383	5.07	2.01
	Post	5.33	1.66	3.20	28	0.03	8.74	1.92
ALOGIA	Pre	.866	1.16	.746	28	.462	3.24	1.51
	Post	3.26	1.53	2.83	28	0.08	5.62	.90
AVOLITION	Pre	.33	1.05	.316	28	.755	1.82	2.49
	Post	2.33	1.22	1.90	28	.067	4.84	.177
ANHEDONIA	Pre	1.06	.765	1.39	28	.174	2.63	.50
	Post	2.20	.806	2.72	28	.011	3.85	.54
ATTENTION	Pre	.266	.926	.288	28	.776	2.16	1.63
	Post	1.86	.896	2.08	28	0.47	3.70	.03

Table 2.3 and 2.4 shows that experimental group has a significant difference in reducing the negative symptoms when compared to the control group.

GRAPH 4


Pre and post of Experimental and Control
35
30
25
20
15
10
5
0
27.53
29.06
20.06
25.4
17.46
18.33
12.6
15.86
15.53
15.2
10.53
12.86
21.33
22.4
18.53
20.73
9.2
9.46
5.86
7.73
Affect flat(pre)
Affect flat(post)
Alogia(pre)
Alogia(post)
Avolition(pre)
Avolition(post)
Anhedonia(pre)
Anhedonia(post)
Attention(pre)
Attention(post)
Experimental group
Control group

Paired t test of individual components of SLOF between experimental and control groups

TABLE 3.1

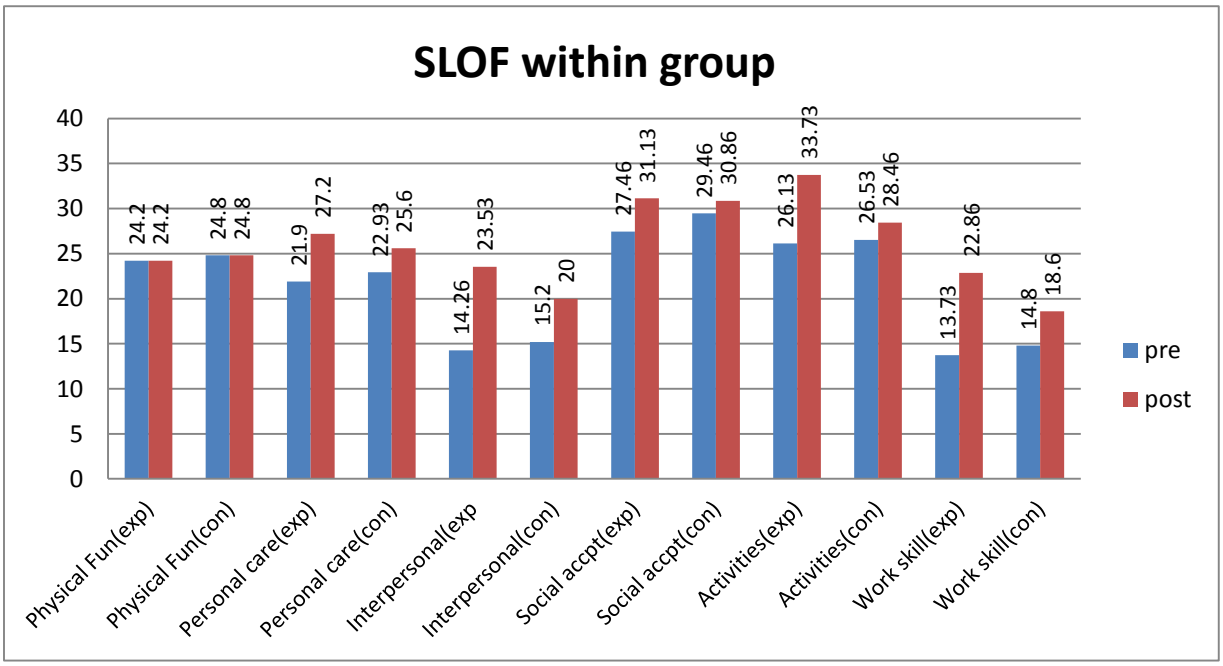
GROUPS	SCALE	VARIABLES	MEAN Pre test	MEAN Post-test	SD Pre test	SD Post-test
EXPERIMENTAL GROUP	SLOF	Physical Functioning	24.20	24.20	1.014	1.014
		Personal care	21.93	27.20	5.93	4.79
		Interpersonal skills	14.26	23.53	3.63	4.01
		Social Acceptability	27.46	31.33	3.06	2.26
		Activities	26.13	33.73	2.75	2.36
		Work skills	13.73	22.86	4.78	5.15
CONTROL GROUP	SLOF	Physical Functioning	24.80	24.80	.560	.56
		Personal care	22.93	25.60	6.25	5.69
		Interpersonal skills	15.20	20.00	4.22	4.17
		Social Acceptability	29.46	30.86	3.29	3.02
		Activities	26.53	28.46	8.07	9.05
		Work skills	14.80	18.06	4.34	4.74

TABLE 3.2

GROUP	SCALES	VARIABLES	Paired Difference							
			MEAN	SD	Std. Error Mean	t	df	Sig. (2-tailed)	Lower	Upper
Experi-mental Group	SLOF	Physical Functioning	-	-	-	-	14	.000	-	-
		Personal care	5.26	2.631	.679	7.752	14	.000	6.72	3.80
		Interpersonal skills	9.26	4.13	1.06	8.66	14	.000	11.55	6.97
		Social Acceptability	3.66	1.79	.464	7.89	14	.000	4.66	2.67
		Activities	7.60	3.52	.909	8.35	14	.000	9.55	5.64
		Work skills	9.13	4.01	1.03	8.80	14	.000	11.35	6.90
Control Group		Physical Functioning	-	-	-	-	14	.000	-	-
		Personal care	2.66	1.91	.494	5.39	14	.000	3.72	1.60
		Interpersonal skills	4.80	2.27	.587	8.17	14	.000	6.05	3.54
		Social Acceptability	1.40	2.44	.630	2.21	14	.044	2.75	.04
		Activities	1.93	4.14	1.07	1.8	14	.093	4.23	.36
		Work skills	3.26	2.78	.720	4.53	14	.000	4.81	1.72

Table 3.1 and 3.2 shows the mean scores of pre and post-test within the experimental and control group. The values indicate the improvement of each component of SLOF in both the groups.

GRAPH 5



Independent t test of individual components of SLOF between experimental and control groups

TABLE 3.3

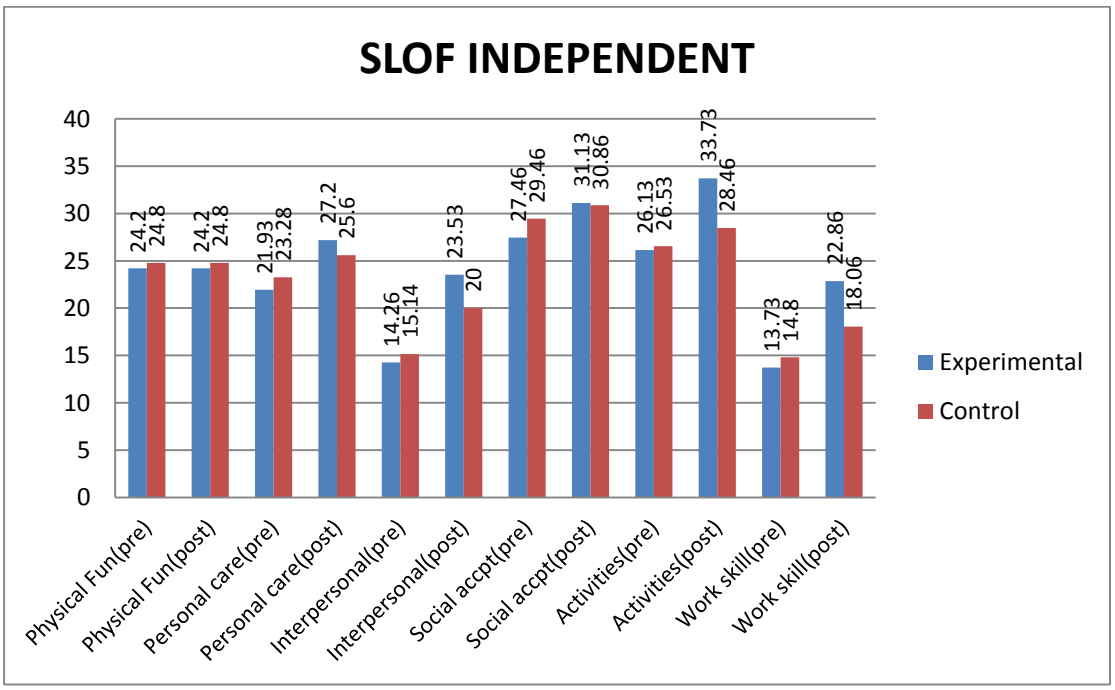
VARIABLES	GROUPS	MEAN Pre test	MEAN Post-test	SD Pre test	SD Post-test
Physical Functioning	Experimental Group	24.20	24.20	1.01	1.01
	Control Group	24.80	24.80	.560	.560
Personal care	Experimental Group	21.93	27.20	5.93	4.79
	Control Group	23.28	25.60	6.23	5.69
Interpersonal skills	Experimental Group	14.26	23.53	3.63	4.01
	Control Group	15.14	20.00	4.38	4.17
Social Acceptability	Experimental Group	27.46	31.13	3.06	2.26
	Control Group	29.46	30.86	3.29	3.02
Work skills	Experimental Group	13.73	22.86	4.78	5.15
	Control Group	14.80	18.06	4.34	4.74
Activities	Experimental Group	26.13	33.73	10.65	9.16
	Control Group	26.53	28.46	8.07	9.05

TABLE 3.4

Variables		MEAN (Difference)	Std. Error Difference	t	df	Sig. (2-tailed)	Lower	Upper
Physical Functioning	Pre	.60	.299	2.005	28	.055	1.21	.01
	Post	.60	.299	2.005	28	.055	1.21	.01
Personal care	Pre	1.35	2.27	.594	27	.558	6.02	3.31
	Post	1.60	1.92	.832	28	.412	2.33	5.53
Interpersonal skills	Pre	.876	1.49	.588	27	.562	3.93	2.18
	Post	3.53	1.49	2.36	28	.025	.46	6.59
Social Acceptability	Pre	2.00	1.16	1.72	28	.096	4.37	.37
	Post	.266	.974	.274	28	.786	1.72	2.26
Work skills	Pre	1.06	1.66	.639	28	.639	4.48	2.35
	Post	4.80	1.80	2.65	28	.013	1.09	8.50
Activities	Pre	.400	3.45	.116	28	.909	7.47	6.67
	Post	5.26	3.32	1.58	28	.125	1.54	12.08

Table 3.3 and 3.4 shows that there is a marked increase in functional abilities of the experimental group and slight increase in the contrl group. This show that experimental group has significant increase in functional abilities.

GRAPH 6



Paired t test of ASP between Experimental and Control Groups

TABLE 4.1

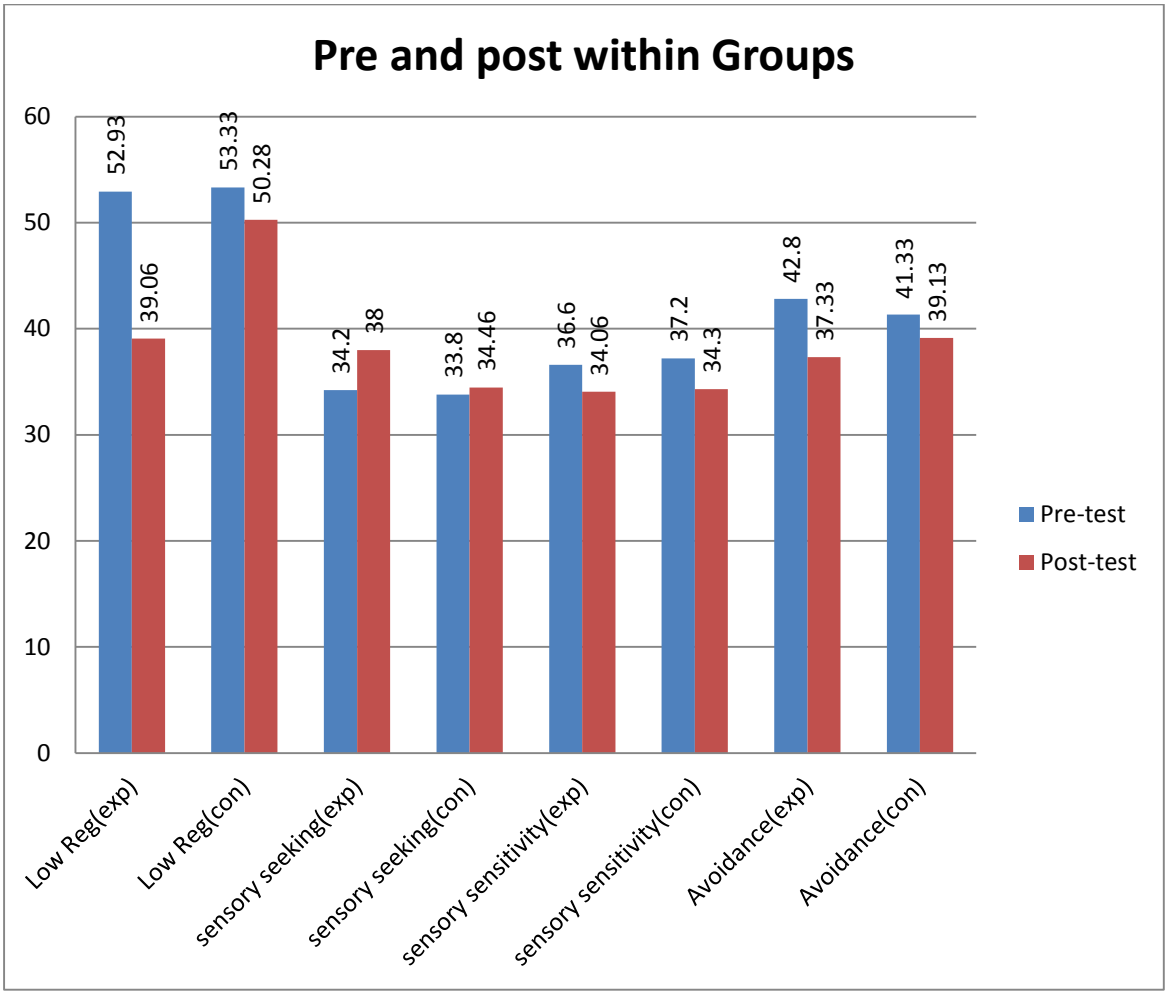
SCALE	GROUPS	VARIABLES	MEAN Pre test	MEAN Post-test	SD Pre test	SD Post-test
ASP	EXPERIMENTAL GROUP	Low Registration	52.93	39.06	2.74	1.96
		Sensory Seeking	34.20	38.00	6.40	1.65
		Sensory Sensitivity	36.60	34.06	3.54	3.28
		Avoidance	42.8	37.33	5.21	5.61
	CONTROL GROUP	Low Registration	53.33	50.26	13.51	12.57
		Sensory Seeking	33.8	34.46	8.37	7.91
		Sensory Sensitivity	37.20	34.33	6.38	7.87
		Avoidance	41.33	39.13	8.32	6.25

TABLE 4.2

SCALE	GROUP	VARIABLES	Paired Difference							
			MEAN (Difference)	SD	Std. Error Mean	t	df	Sig. (2-tailed)	Lower	Upper
ASP	EXPERIMENTAL GROUP	Low Registration	13.86	4.43	1.14	12.10	14	.000	11.40	16.32
		Sensory Seeking	3.80	6.98	1.80	2.10	14	.054	7.66	.06
		Sensory Sensitivity	2.53	3.33	.86	2.94	14	.011	.68	4.38
		Avoidance	5.46	3.85	.994	5.49	14	.000	3.33	7.59
	CONTROL GROUP	Low Registration	3.06	3.45	.891	3.44	14	.004	1.15	4.97
		Sensory Seeking	.66	3.22	.831	.801	14	.436	2.45	1.11
		Sensory Sensitivity	2.86	2.69	.696	4.11	14	.001	1.37	4.35
		Avoidance	2.20	3.05	.788	2.79	14	.014	.50	3.89

The mean value Table 4.1 and 4.2 indicates that both the group has significant difference between the pre and post-test scores of experimental and control group. Both the group shows improvement in the components of ASP.

GRAPH 7


Pre and post within Groups
60
50
40
30
20
10
0
52.93
39.06
53.33
50.28
34.2
38
33.8
34.46
36.6
34.06
37.2
34.3
42.8
37.33
41.33
39.13
Low Reg(exp)
Low Reg(con)
sensory seeking(exp)
sensory seeking(con)
sensory sensitivity(exp)
sensory sensitivity(con)
Avoidance(exp)
Avoidance(con)
Pre-test
Post-test

Independent t test of ASP between Experimental and Control Groups

TABLE 4.3

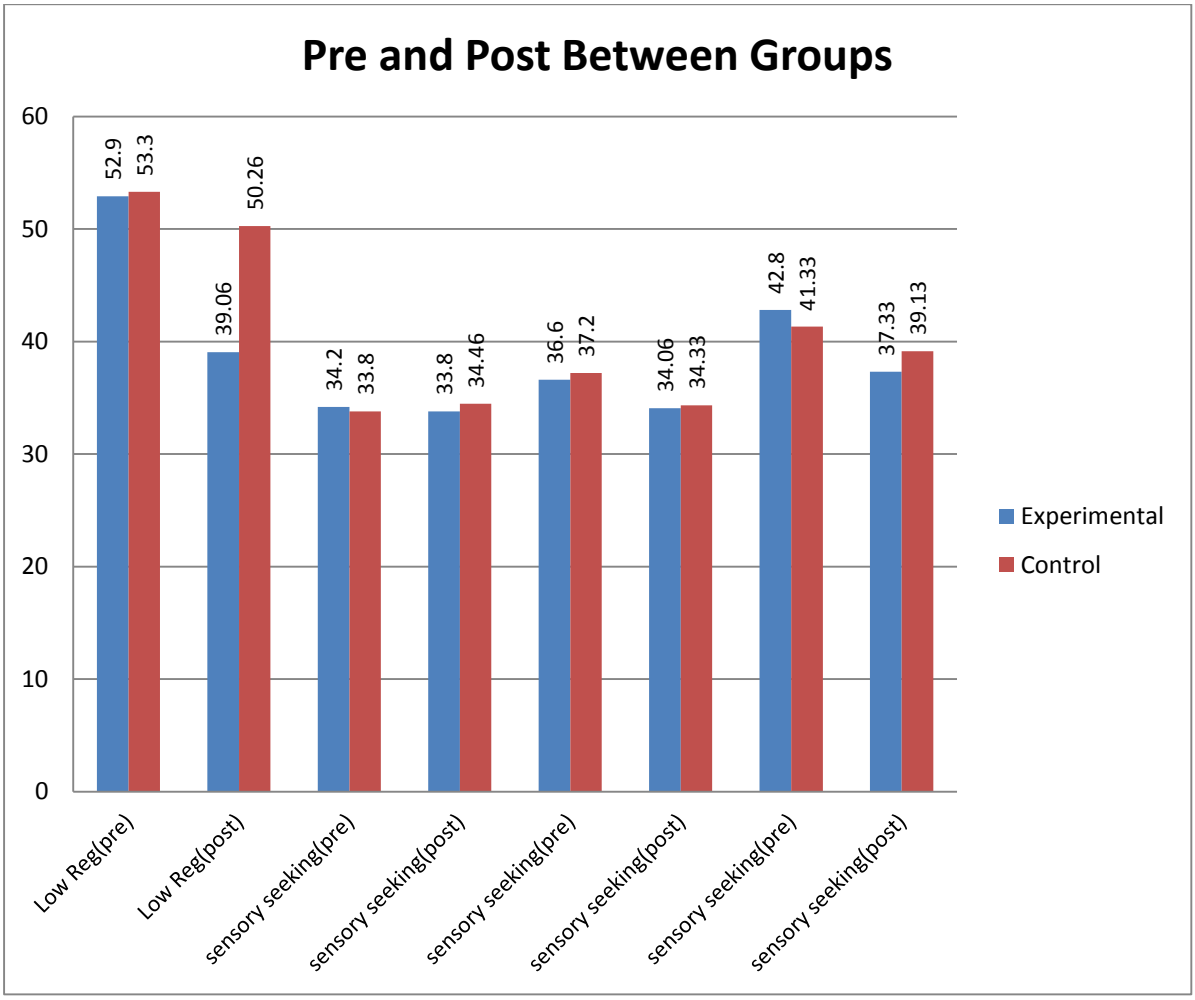
VARIABLES	GROUPS	MEAN Pre test	MEAN Post-test	SD Pre test	SD Post-test
Low Registration	Experimental Group	52.93	39.06	10.64	7.62
	Control Group	79.33	50.26	98.72	12.57
Sensory Seeking	Experimental Group	34.20	38.00	6.14	6.40
	Control Group	33.80	34.46	8.37	7.91
Sensory Sensitivity	Experimental Group	36.60	34.06	3.54	3.28
	Control Group	37.20	34.33	6.38	7.87
Avoidance	Experimental Group	42.80	37.33	5.21	5.61
	Control Group	41.33	39.13	8.32	6.25

TABLE 4.4

VARIABLES		MEAN	Std. Error Difference	t	df	Sig. (2-tailed)	Lower	Upper
Low Registration	Pre	26.40	25.63	1.03	28	.312	78.91	26.11
	Post	11.20	3.79	2.94	28	.006	18.98	3.41
Sensory Seeking	Pre	.400	2.68	.149	28	.883	5.09	5.89
	Post	3.53	2.62	1.34	28	.190	1.85	8.91
Sensory Sensitivity	Pre	.600	1.88	.318	28	.753	4.46	3.26
	Post	.266	2.20	.121	28	.904	4.77	4.24
Avoidance	Pre	1.466	2.53	.578	28	.568	3.73	6.66
	Post	1.80	2.17	.829	28	.414	6.24	2.64

The results of the Table 4.3 and 4.4 indicate that experimental group is more effective on reducing sensory issues than the control group.

GRAPH 8


Pre and Post Between Groups
60
50
40
30
20
10
0
52.9
53.3
39.06
50.26
34.2
33.8
33.8
34.46
36.6
37.2
34.06
34.33
42.8
41.33
37.33
39.13
Low Reg(pre)
Low Reg(post)
sensory seeking(pre)
sensory seeking(post)
sensory seeking(pre)
sensory seeking(post)
sensory seeking(pre)
sensory seeking(post)
Experimental
Control

RESULTS

RESULTS

All participants of the study were selected using SANS as the screening tool. 30 schizophrenic patients with negative symptoms were selected. The experimental group had 15 patients and the control group had 15 patients. SLOF and ASP were administered on them. The results of SANS and SLOF are provided .The results of post intervention of SANS and SLOF were calculated for experimental and control group using paired t test (Table 1.1) and independent t test (Table 1.2). The results of paired t test showed that there was significant difference in post intervention of experimental group (mean value of SANS-23.33, SLOF-35.6 and t value of SANS-12.36, SLOF-14.20) and control group also had difference (mean of SANS-11.66, SLOF-13.4 and t value of SANS-9.461, SLOF-5.480) in both negative symptoms and functional abilities. The independent t test showed that experimental group (mean value of SANS-15.00, SLOF-12.9, t value of SANS-3.16, SLOF-1.64) had significant difference than control group in reduction of negative symptoms and improvement of functional abilities in schizophrenic patients (Table 1.3 and Table 1.4).

Results of analysis of Scale for the Assessment of Negative Symptoms (SANS):

Each component of SANS were analysed individually using paired t test (Table 2.2) and independent t test (Table 2.4).

Affective Flattening:

The experimental group showed significant reduction (mean-7.466, t-9.089) in the components of affective flattening. The control group showed slight difference in the post scores (mean-3.66, t-10.16).

At baseline there was a difference between experimental and control group in the component of affective flattening (mean-1.53, t-.886), but on post-test between the experimental and control group there is a significant difference (mean-5.33 t-3.20). This reveals that there is marked reduction of affective flattening in the experimental group when compared to the control group.

Alogia:

The experimental group showed significant reduction (mean-4.86, t-9.12) in the components of alogia. The control group showed slight difference in the post scores (mean-2.46, t-5.40).

At baseline there was a slight difference between experimental and control group in the component of alogia (mean-.866, t-.746), but on post-test between the experimental and control group there is a significant difference (mean-3.26 t-2.83). This reveals that there is marked reduction of alogia in the experimental group when compared to the control group.

Avolition:

The experimental group showed significant reduction (mean-5.0, t-7.17) in the components of avolition. The control group showed slight difference in the post scores (mean-2.33, t-6.04).

At baseline there was a slight difference between experimental and control group in the component of avolition (mean-.33, t-.316), but on post-test between the experimental and control group there is a significant difference (mean-2.33 t-1.90). This reveals that there is marked reduction of avolition in the experimental group when compared to the control group.

Anhedonia:

The experimental group showed significant reduction (mean-2.80, t-5.50) in the components of anhedonia. The control group showed slight difference in the post scores (mean-1.66, t-6.64).

At baseline there was a slight difference between experimental and control group in the component of anhedonia (mean-1.06, t-1.39), but on post-test between the experimental and control group there is a significant difference (mean-2.20 t-2.72). This reveals that there is marked reduction of anhedonia in the experimental group when compared to the control group.

Attention:

The experimental group showed significant reduction (mean-3.33, t-5.35) in the components of attention. The control group showed slight difference in the post scores (mean-1.73, t-4.84).

At baseline there was a slight difference between experimental and control group in the component of attention (mean-.266, t-.288), but on post-test between the experimental and control group there is a significant difference (mean-1.86, t-2.08). This reveals that there is marked improvement of attention in the experimental group when compared to the control group.

Results of analysis of Specific Level of Functioning Scale (SLOF):

Each components of SLOF were analysed individually. The scores of paired t test (Table3.2) and independent t test(Table3.4) are used for calculating the result.

Physical Functioning:

Analyses within the experimental group revealed that there was no difference in pre-test and post-test scores. This reveals that there is no change in all the components of physical functioning post intervention. Analyses within the control group revealed that there was no difference pre-test to post-test. The scores of post-test between the experimental and control also had no difference. This reveals that the participants in the experimental group had no change in post intervention.

Personal Care:

Analyses within the experimental group revealed that there was a significant difference in the components of personal care (mean-5.26, t-7.75) between pre-test and post-test scores. This reveals that there is marked improvement in all the components of personal care in post intervention.

Analyses within the control group revealed that there was slight difference (mean-2.66, t-5.39) from pre- to post-test.

On post-test between the experimental and control group there was a significant difference in the components of personal care (mean-1.60, t-2.36). This

reveals that the participants in the experimental group improved markedly in their personal care, post intervention.

Interpersonal Relationships:

Analyses within the experimental group revealed that there was a significant difference in the components of interpersonal relationships (mean-9.26, t-8.66) between pre-test and post-test scores. This reveals that there is marked improvement in all the components of personal care in post intervention.

Analyses within the control group revealed that there was significant difference (mean-4.80, t-8.17) from pre- to post-test.

On post-test between the experimental and control group there was a significant difference in the components of interpersonal relationships (mean-3.53, t-2.36). This reveals that the participants in the experimental group improved markedly in their interpersonal relationships, post intervention.

Social Acceptability:

Analyses within the experimental group revealed that there was a significant difference in the components of social acceptability (mean-3.66, t-7.89) between pre-test and post-test scores. This reveals that there is improvement in all the components of social acceptability in post intervention.

Analyses within the control group revealed that there was significant difference (mean-1.40, t-2.21) from pre-test to post-test.

On post-test between the experimental and control group there was a similar difference in the components of social acceptability (mean-.266, t-.274). This reveals that the participants in the experimental group and control group had similar improvement in their social acceptability, post intervention.

Work Skills:

Analyses within the experimental group revealed that there was a significant difference in the components of work skills (mean-9.13, t-8.80) between pre-test and post-test scores. This reveals that there is marked improvement in all the components of work skills in post intervention.

Analyses within the control group revealed that there was significant difference (mean-3.26, t-4.53) from pre-test to post-test.

On post-test between the experimental and control group there was a similar difference in the components of work skills (mean-.4.80, t-2.65). This reveals that the participants in the experimental group had marked improvement in their work skills, post intervention.

Activities:

Analyses within the experimental group revealed that there was a significant difference in the components of activities (mean-7.60, t-8.35) between pre-test and post-test scores. This reveals that there is marked improvement in all the components of activities in post intervention. Analyses within the control group revealed that there was significant difference (mean-1.93, t-1.8) from pre-test to post-test.

On post-test between the experimental and control group there was a similar difference in the components of activities (mean-5.26, t-1.58). This reveals that the participants in the experimental group had marked improvement in their activities, post intervention.

Results of analysis of Adult Sensory Profile:

The experimental group revealed a significant difference in the component of low registration (mean-13.86, t-12.10), avoidance (mean-5.46, t-2.79) and sensory seeking (mean-3.80, t-2.10) from pre- to post-test. This reveals that there is marked improvement in the three components of ASP (Table 4.2). Whereas control group had more difference in sensation sensitivity (mean-2.86, t-4.11)

There was a significant difference in the components of low registration, avoidance, sensory seeking but not in sensory sensitivity from pre-test to post-test. On between groups comparison at pre-test revealed there was difference in the components of ASP. This shows that both the experimental and control group were having sensory issues. The post-test between the experimental and control group there was a significant difference in the components of low registration, sensory seeking, sensory sensitivity and avoidance. This reveals that the participants in the experimental group improvement in their sensory issues.

DISCUSSION

DISCUSSION

Sensory impairment as one of the first signs of "preference" of schizophrenia were not investigated because it was thought that sensory functions are not affected by the disorder or seen in patient testimonials relating to sensory or cognitive emotional interpretations. Sensory stimuli are filled in the environment, the process by which each individual process these stimuli and respond to it appropriately is known as sensory integration (1). As King and others reported in their studies, schizophrenic patients have difficulty in processing these sensory stimuli, either they don't recognize these (Low Registration) or they over inhibit (sensory avoidance) which results in symptoms, in this negative symptoms cause more problems in functioning and are resistant to treatment. SI on all components of SANS had a significant difference in the experimental group when compared with the control group. When broken into individual components, affective flattening and anhedonia had greater effect when compared to alogia, avolition and attention. Control group had effect on all the components of SANS but it was less when compared to experimental group. In SLOF the SI group showed more improvement interpersonal skill, activities and social acceptability and both the control and experimental group had no changes in physical functioning. ASP gave evidence to the previous studies by showing that schizophrenic patients had low registration and avoidance more when compared with sensory sensitivity and sensory seeking. Low registration showed marked improvement in the experimental group followed by avoidance and other components. Control group also showed improvement to a minimal level. This study also adds evidence to King's point and also proves that sensory integration is an effective treatment for negative symptoms in schizophrenic patients and also that decrease in negative symptoms can improve the functioning level of the patients.

CONCLUSION

CONCLUSION

Based on the results it can be suggested that sensory integration therapy can be used as an effective intervention for reducing negative symptoms and improving functional abilities in schizophrenic patients.

LIMITATIONS AND RECOMMENDATIONS

LIMITATIONS AND RECOMMENDATIONS

LIMITATIONS

- The study was conducted for a short duration of 8 weeks.
- Smaller sample size.
- No follow up programs were conducted to find the long term effects.

RECOMMENDATIONS

- Larger sample size can be included.
- Follow up programs can be conducted to find the long term effects of the intervention.

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REFERENCES

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APPENDIX

SANS: Scale for the Assessment of Negative Symptoms

Identification

First Name	Middle Name	Last Name
		Doe

Patient ID	Date of Birth	Gender	Age	Initials

Interview Date

Scale for the Assessment of Negative Symptoms

SANS CODES

0 = None/Not at all 2 = Mild 4 = Marked 9 = Unknown/Cannot be
1 = Questionable 3 = Moderate 5 = Severe assessed/Not assessed

AFFECTIVE FLATTENING OR BLUNTING

	None ----------> Severe Unk						
	0	1	2	3	4	5	9
1. Unchanging Facial Expression The patient's face appears wooden-changes less than expected as emotional content of discourse changes.	○	○	○	○	○	○	○
2. Decreased Spontaneous Movements The patient shows few or no spontaneous movements, does not shift position, move extremities, etc.	○	○	○	○	○	○	○
3. Paucity of Expressive Gestures The patient does not use hand gestures or body position as an aid in expressing his ideas.	○	○	○	○	○	○	○
4. Poor Eye Contact The patient avoids eye contact or "stares through" interviewer even when speaking.	○	○	○	○	○	○	○
5. Affective Nonresponsivity The patient fails to laugh or smile when prompted.	○	○	○	○	○	○	○
6. Inappropriate Affect The patient's affect is inappropriate or incongruous, not simply flat or blunted.	○	○	○	○	○	○	○
7. Lack of Vocal Inflections The patient fails to show normal vocal emphasis patterns, is often monotonic.	○	○	○	○	○	○	○
8. Global Rating of Affective Flattening This rating should focus on overall severity of symptoms, especially unresponsiveness, inappropriateness and an overall decrease in emotional intensity.	○	○	○	○	○	○	○

ALOGIA

	0	1	2	3	4	5	9
9. Poverty of Speech The patient's replies to questions are restricted in amount, tend to be brief, concrete, unelaborated.	○	○	○	○	○	○	○
10. Poverty of Content of Speech The patient's replies are adequate in amount but tend to be vague, over concrete or over generalized, and convey little in information.	○	○	○	○	○	○	○

SANS: Scale for the Assessment of Negative Symptoms

INFOTECH Soft, Inc.

Identification

First Name	Middle Name	Last Name		
John	James	Doe		
Patient ID	**Date of Birth**	**Gender**	**Age**	**Initials**
123456789	3/23/1980	male	26	JJD

Interview Date

Scale for the Assessment of Negative Symptoms

SANS CODES

0 = None/Not at all 2 = Mild 4 = Marked 9 = Unknown/Cannot be
1 = Questionable 3 = Moderate 5 = Severe assessed/Not assessed

AFFECTIVE FLATTENING OR BLUNTING

1. Unchanging Facial Expression

The patient's face appears wooden-changes less than expected as emotional content of discourse changes.

None ----------> Severe Unk

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 9

2. Decreased Spontaneous Movements

The patient shows few or no spontaneous movements, does not shift position, move extremities, etc.

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 9

3. Paucity of Expressive Gestures

The patient does not use hand gestures or body position as an aid in expressing his ideas.

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 9

4. Poor Eye Contact

The patient avoids eye contact or "stares through" interviewer even when speaking.

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 9

5. Affective Nonresponsivity

The patient fails to laugh or smile when prompted.

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 9

6. Inappropriate Affect

The patient's affect is inappropriate or incongruous, not simply flat or blunted.

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 9

7. Lack of Vocal Inflections

The patient fails to show normal vocal emphasis patterns, is often monotonic.

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 9

8. Global Rating of Affective Flattening

This rating should focus on overall severity of symptoms, especially unresponsiveness, inappropriateness and an overall decrease in emotional intensity.

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 9

ALOGIA

9. Poverty of Speech

The patient's replies to questions are restricted in amount, tend to be brief, concrete, unelaborated.

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 9

10. Poverty of Content of Speech

The patient's replies are adequate in amount but tend to be vague, over concrete or over generalized, and convey little in information.

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 9

11. Blocking

The patient indicates, either spontaneously or with prompting, that his train of thought was interrupted.

○ ○ ○ ○ ○ ○ ○
0 1 2 3 4 5 9

12. Increased Latency of Response

The patient takes a long time to reply to questions, prompting indicates the patient is aware of the question.

○ ○ ○ ○ ○ ○ ○
0 1 2 3 4 5 9

13. Global Rating of Alogia

The core features of alogia are poverty of speech and poverty of content.

○ ○ ○ ○ ○ ○ ○
0 1 2 3 4 5 9

AVOLITION/APATHY

14. Grooming and Hygiene

The patient's clothes may be sloppy or soiled, and he may have greasy hair, body odor, etc.

○ ○ ○ ○ ○ ○ ○
0 1 2 3 4 5 9

15. Inpersistence at Work or School

The patient has difficulty seeking or maintaining employment, completing school work, keeping house, etc. If an inpatient, cannot persist at ward activities, such as OT, playing cards, etc.

○ ○ ○ ○ ○ ○ ○
0 1 2 3 4 5 9

16. Physical Anergia

The patient tends to be physically inert. He may sit for hours and not initiate spontaneous activity.

○ ○ ○ ○ ○ ○ ○
0 1 2 3 4 5 9

17. Global Rating of Avolition/Apathy

Strong weight may be given to one or two prominent symptoms if particularly striking.

○ ○ ○ ○ ○ ○ ○
0 1 2 3 4 5 9

ANHEDONIA/ASOCIALITY

18. Recreational Interests and Activities

The patient may have few or no interests. Both the quality and quantity of interests should be taken into account.

○ ○ ○ ○ ○ ○ ○
0 1 2 3 4 5 9

19. Sexual Activity

The patient may show decrease in sexual interest and activity, or no enjoyment when active.

○ ○ ○ ○ ○ ○ ○
0 1 2 3 4 5 9

20. Ability to Feel Intimacy and Closeness

The patient may display an inability to form close or intimate relationships, especially with opposite sex and family.

○ ○ ○ ○ ○ ○ ○
0 1 2 3 4 5 9

21. Relationships with Friends and Peers

The patient may have few or no friends and may prefer to spend all his time isolated.

○ ○ ○ ○ ○ ○ ○
0 1 2 3 4 5 9

22. Global Rating of Anhedonia/Asociality

This rating should reflect overall severity, taking into account the patient's age, family status, etc.

○ ○ ○ ○ ○ ○ ○
0 1 2 3 4 5 9

ATTENTION

23. Social Inattentiveness

The patient appears uninvolved or unengaged. He may seem "spacey".

○ ○ ○ ○ ○ ○ ○
0 1 2 3 4 5 9

24. Inattentiveness During Mental Status Testing

Refer to tests of "serial 7s" (at least five subtractions) and spelling "world" backwards.

○ ○ ○ ○ ○ ○ ○
0 1 2 3 4 5 9

25. Global Rating of Attention

This rating should assess the patient's overall concentration, both clinically and on tests.

○ ○ ○ ○ ○ ○ ○
0 1 2 3 4 5 9

ADOLESCENT/ADULT SENSORY PROFILE™

Catana Brown, Ph.D., OTR, FAOTA
Winnie Dunn, Ph.D., OTR, FAOTA

Self Questionnaire

Name: _____ Age: _____ Date: _____

Birthdate: _____ Gender: ☐ Male ☐ Female

Are there aspects of daily life that are not satisfying to you? If yes, please explain. _____

_____

_____

_____

INSTRUCTIONS

Please check the box that **best** describes the frequency with which you perform the following behaviors. If you are unable to comment because you have not experienced a particular situation, please draw an X through that item's number. Write any comments at the end of each section.

Please answer all of the statements. Use the following key to mark your responses:

ALMOST NEVER	When presented with the opportunity, you **almost never** respond in this manner (about 5% or less of the time).
SELDOM	When presented with the opportunity, you **seldom** respond in this manner (about 25% of the time).
OCCASIONALLY	When presented with the opportunity, you **occasionally** respond in this manner (about 50% of the time).
FREQUENTLY	When presented with the opportunity, you **frequently** respond in this manner (about 75% of the time).
ALMOST ALWAYS	When presented with the opportunity, you **almost always** respond in this manner (about 95% or more of the time).

PEARSON

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28 29 30 31 32 33 34 35 A B C D E

PsychCorp

0761649727

Item		A. Taste/Smell Processing	ALMOST NEVER	SELDOM	OCCASIONALLY	FREQUENTLY	ALMOST ALWAYS
	1	I leave or move to another section when I smell a strong odor in a store (for example, bath products, candles, perfumes).					
	2	I add spice to my food.					
	3	I don't smell things that other people say they smell.					
	4	I enjoy being close to people who wear perfume or cologne.					
	5	I only eat familiar foods.					
	6	Many foods taste bland to me (in other words, food tastes plain or does not have a lot of flavor).					
	7	I don't like strong tasting mints or candies (for example, hot/cinnamon or sour candy).					
	8	I go over to smell fresh flowers when I see them.					

Comments

Item		B. Movement Processing	ALMOST NEVER	SELDOM	OCCASIONALLY	FREQUENTLY	ALMOST ALWAYS
	9	I'm afraid of heights.					
	10	I enjoy how it feels to move about (for example, dancing, running).					
	11	I avoid elevators and/or escalators because I dislike the movement.					
	12	I trip or bump into things.					
	13	I dislike the movement of riding in a car.					
	14	I choose to engage in physical activities.					
	15	I am unsure of footing when walking on stairs (for example, I trip, lose balance, and/or need to hold the rail).					
	16	I become dizzy easily (for example, after bending over, getting up too fast).					

Comments

Item		C. Visual Processing	ALMOST NEVER	SELDOM	OCCASIONALLY	FREQUENTLY	ALMOST ALWAYS
	17	I like to go to places that have bright lights and that are colorful.					
	18	I keep the shades down during the day when I am at home.					
	19	I like to wear colorful clothing.					
	20	I become frustrated when trying to find something in a crowded drawer or messy room.					
	21	I miss the street, building, or room signs when trying to go somewhere new.					
	22	I am bothered by unsteady or fast moving visual images in movies or TV.					
	23	I don't notice when people come into the room.					
	24	I choose to shop in smaller stores because I'm overwhelmed in large stores.					
	25	I become bothered when I see lots of movement around me (for example, at a busy mall, parade, carnival).					
	26	I limit distractions when I am working (for example, I close the door, or turn off the TV).					

Comments

Item		D. Touch Processing	ALMOST NEVER	SELDOM	OCCASIONALLY	FREQUENTLY	ALMOST ALWAYS
	27	I dislike having my back rubbed.					
	28	I like how it feels to get my hair cut.					
	29	I avoid or wear gloves during activities that will make my hands messy.					
	30	I touch others when I'm talking (for example, I put my hand on their shoulder or shake their hands).					
	31	I am bothered by the feeling in my mouth when I wake up in the morning.					
	32	I like to go barefoot.					
	33	I'm uncomfortable wearing certain fabrics (for example, wool, silk, corduroy, tags in clothing).					
	34	I don't like particular food textures (for example, peaches with skin, applesauce, cottage cheese, chunky peanut butter).					
	35	I move away when others get too close to me.					
	36	I don't seem to notice when my face or hands are dirty.					
	37	I get scrapes or bruises but don't remember how I got them.					
	38	I avoid standing in lines or standing close to other people because I don't like to get too close to others.					
	39	I don't seem to notice when someone touches my arm or back.					

omments

Item		E. Activity Level	ALMOST NEVER	SELDOM	OCCASIONALLY	FREQUENTLY	ALMOST ALWAYS
	40	I work on two or more tasks at the same time.					
	41	It takes me more time than other people to wake up in the morning.					
	42	I do things on the spur of the moment (in other words, I do things without making a plan ahead of time).					
	43	I find time to get away from my busy life and spend time by myself.					
	44	I seem slower than others when trying to follow an activity or task.					
	45	I don't get jokes as quickly as others.					
	46	I stay away from crowds.					
	47	I find activities to perform in front of others (for example, music, sports, acting, public speaking, and answering questions in class).					
	48	I find it hard to concentrate for the whole time when sitting in a long class or a meeting.					
	49	I avoid situations where unexpected things might happen (for example, going to unfamiliar places or being around people I don't know).					

Comments

Item		F. Auditory Processing	ALMOST NEVER	SELDOM	OCCASIONALLY	FREQUENTLY	ALMOST ALWAYS
	50	I hum, whistle, sing, or make other noises.					
	51	I startle easily at unexpected or loud noises (for example, vacuum cleaner, dog barking, telephone ringing).					
	52	I have trouble following what people are saying when they talk fast or about unfamiliar topics.					
	53	I leave the room when others are watching TV, or I ask them to turn it down.					
	54	I am distracted if there is a lot of noise around.					
	55	I don't notice when my name is called.					
	56	I use strategies to drown out sound (for example, close the door, cover my ears, wear ear plugs).					
	57	I stay away from noisy settings.					
	58	I like to attend events with a lot of music.					
	59	I have to ask people to repeat things.					
	60	I find it difficult to work with background noise (for example, fan, radio).					

Comments

Summary Score Sheet

Quadrant Grid

Instructions: Transfer from the *Self Questionnaire* the item raw score that corresponds with each item listed (refer to the *User's Manual* for directions on how to obtain item raw scores). Add the Raw Score column to get the Quadrant Raw Score Total for each quadrant.

QUADRANT 1	
Low Registration	
Item	Raw Score
3	
6	
12	
15	
21	
23	
36	
37	
39	
41	
44	
45	
52	
55	
59	
Quadrant Raw Score Total	

QUADRANT 2	
Sensation Seeking	
Item	Raw Score
2	
4	
8	
10	
14	
17	
19	
28	
30	
32	
40	
42	
47	
50	
58	
Quadrant Raw Score Total	

QUADRANT 3	
Sensory Sensitivity	
Item	Raw Score
7	
9	
13	
16	
20	
22	
25	
27	
31	
33	
34	
48	
51	
54	
60	
Quadrant Raw Score Total	

QUADRANT 4	
Sensation Avoiding	
Item	Raw Score
1	
5	
11	
18	
24	
26	
29	
35	
38	
43	
46	
49	
53	
56	
57	
Quadrant Raw Score Total	

SCORE KEY	
1	Almost Never
2	Seldom
3	Occasionally
4	Frequently
5	Almost Always

ICON KEY	
—	Low Registration
S	Sensation Seeking
Spiral	Sensory Sensitivity
|	Sensation Avoiding

Quadrant Summary

Instructions: Choose the appropriate Quadrant Summary Chart and then transfer the Quadrant Raw Score Total from the previous page to the corresponding Quadrant Raw Score Total box. Plot these totals by marking an X in the appropriate classification column (Much Less than Most People, Less than Most People, etc.).*

Quadrant Summary Chart for Ages 11–17

Quadrant	Quadrant Raw Score Total	Much Less Than Most People	Less Than Most People	Similar To Most People	More Than Most People	Much More Than Most People
		– –	–	=	+	+ +
1. Low Registration	/75	15 ---------- 18	19 ---------- 26	27 ---------- 40	41 ---------- 51	52 ---------- 75
2. Sensation Seeking	/75	15---------- 27	28 ---------- 41	42 ---------- 58	59 ---------- 65	66 ---------- 75
3. Sensory Sensitivity	/75	15 ---------- 19	20 ---------- 25	26 ---------- 40	41 ---------- 48	49 ---------- 75
4. Sensation Avoiding	/75	15 ---------- 18	19 ---------- 25	26 ---------- 40	41 ---------- 48	49 ---------- 75

*Classifications are based on the performance of individuals without disabilities ($n = 193$).

Quadrant Summary Chart for Ages 18–64

Quadrant	Quadrant Raw Score Total	Much Less Than Most People	Less Than Most People	Similar To Most People	More Than Most People	Much More Than Most People
		– –	–	=	+	+ +
1. Low Registration	/75	15 ---------- 18	19 ---------- 23	24 ---------- 35	36 ---------- 44	45 ---------- 75
2. Sensation Seeking	/75	15 ---------- 35	36 ---------- 42	43 ---------- 56	57 ---------- 62	63 ---------- 75
3. Sensory Sensitivity	/75	15 ---------- 18	19 ---------- 25	26 ---------- 41	42 ---------- 48	49 ---------- 75
4. Sensation Avoiding	/75	15 ---------- 19	20 ---------- 26	27---------- 41	42 ---------- 49	50 ---------- 75

*Classifications are based on the performance of individuals without disabilities ($n = 496$).

Quadrant Summary Chart for Ages 65 and older

Quadrant	Quadrant Raw Score Total	Much Less Than Most People	Less Than Most People	Similar To Most People	More Than Most People	Much More Than Most People
		– –	–	=	+	+ +
1. Low Registration	/75	15 ---------- 19	20 ---------- 26	27 ---------- 40	41 ---------- 51	52 ---------- 75
2. Sensation Seeking	/75	15 ---------- 28	29 ---------- 39	40 ---------- 52	53 ---------- 63	64 ---------- 75
3. Sensory Sensitivity	/75	15 ---------- 18	19 ---------- 25	26 ---------- 41	42 ---------- 48	49 ---------- 75
4. Sensation Avoiding	/75	15 ---------- 18	19 ---------- 25	26 ---------- 42	43 ---------- 49	50 ---------- 75

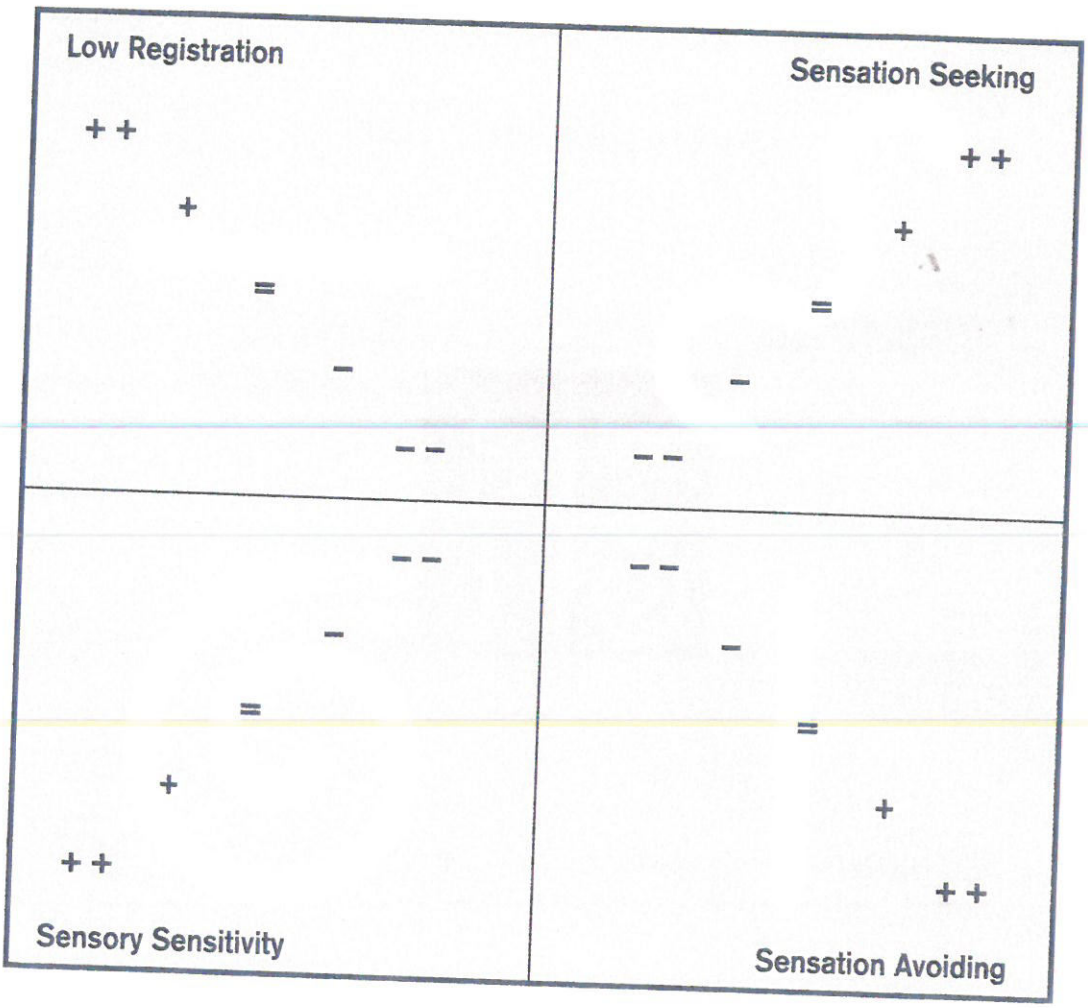
*Classifications are based on the performance of individuals without disabilities ($n = 261$).

Quadrant Profile

Instructions: Transfer the information from the classification columns of the Quadrant Summary Chart (the areas marked with an X) to the Quadrant Profile. Circle the classification symbol in each quadrant below that corresponds with the classification information for that quadrant. Finally, check the appropriate age box.

The following symbols are used to represent the classifications on the Quadrant Profile:

- – – Much Less Than Most People
- – Less Than Most People
- = Similar to Most People
- + More Than Most People
- + + Much More Than Most People



See chapter 5 for more information regarding interpretations and intervention.

Check the correct age:

- ☐ 11–17 years
- ☐ 18–64 years
- ☐ 65 years and older

State of Illinois Department of Human Services

SPECIFIC LEVEL OF FUNCTIONING ASSESSMENT AND PHYSICAL HEALTH INVENTORY

RATER INFORMATION

Name of Rater: _____

(please print)

Rater's Title: _____

Date on which this form was filled out: _____

INDIVIDUAL INFORMATION

Individual Name: _____

Individual Social Security Number: _____

Date of Birth: _____

Sex: ☐ Male ☐ Female

Home Address: _____

Is this person able to speak, read and understand English?

☐ Yes ☐ No

If No, what language or adaptations does the person ordinarily require?

_____

Specify

On the following pages you will be asked to make some judgments about this individual's skills and abilities. Please remember that your answers should reflect what has been most typical of the individual during the past week, the way the individual has been most of the time. Therefore, do not limit your rating only to the way the individual was the last time you saw him/her. Your rating will have a great deal to do with the service this person will receive, so it is essential that you use your knowledge of the individual's usual condition during the past week.

Base your answers on how persons of similar age, sex, and general background manage these activities in normal daily living. Do not use your program or facility as your only basis for comparison. We are less interested in how well someone has adjusted to your program than we are in how well they could manage outside it.

Above all, use common sense. These items are not too technical or complex, and you should use the best information and best judgment you can in making the assessment.

This assessment was adapted from the New Jersey Specific Level of Functioning and New York Level of Care

State of Illinois Department of Human Services

SPECIFIC LEVEL OF FUNCTIONING ASSESSMENT AND PHYSICAL HEALTH INVENTORY

Instructions: Check the number that best describes this person's typical level of functioning on each item listed below. BE AS ACCURATE AS YOU CAN. If you are not sure about a certain rating, ask someone who might know or consult the case record.

MARK ONLY ONE NUMBER FOR EACH ITEM, BE SURE TO MARK ALL ITEMS.

	SELF MAINTENANCE				
A. Physical Functioning	NO PROBLEM	PROBLEM, BUT NO EFFECT ON GENERAL FUNCTIONING	SLIGHT EFFECT ON GENERAL FUNCTIONING	RESTRICTS GENERAL FUNCTIONING SUBSTANTIALLY	PREVENTS GENERAL FUNCTIONING
1. VISION	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
2. HEARING	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
3. SPEECH IMPAIRMENT	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
4. WALKING, USE OF LEGS	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
5. USE OF HANDS AND ARMS	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
B. Personal Care Skills	TOTALLY SELF-SUFFICIENT	NEEDS VERBAL ADVICE OR GUIDANCE	NEEDS SOME PHYSICAL HELP OR ASSISTANCE	NEEDS SUBSTANTIAL HELP	TOTALLY DEPENDENT
6. TOILETING (uses toilet properly; keeps self and area clean)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
7. EATING (uses utensils properly; eating habits)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
8. PERSONAL HYGIENE (body and teeth; general cleanliness)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
9. DRESSING SELF (selects appropriate garments; dresses self)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
10. GROOMING (hair, make-up, general appearance)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
11. CARE OF OWN POSSESSIONS	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
12. CARE OF OWN LIVING SPACE	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1

SPECIFIC LEVEL OF FUNCTIONING ASSESSMENT AND PHYSICAL HEALTH INVENTORY

SOCIAL FUNCTIONING

C. Interpersonal Relationships	HIGHLY TYPICAL OF THIS PERSON	GENERALLY TYPICAL OF THIS PERSON	SOMEWHAT TYPICAL OF THIS PERSON	GENERALLY UNTYPICAL OF THIS PERSON	HIGHLY UNTYPICAL OF THIS PERSON
13. ACCEPTS CONTACT WITH OTHERS (does not withdraw or turn away)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
14. INITIATES CONTACT WITH OTHERS	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
15. COMMUNICATES EFFECTIVELY (speech and gestures are understandable and to the point)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
16. ENGAGES IN ACTIVITIES WITHOUT PROMPTING	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
17. PARTICIPATES IN GROUPS	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
18. FORMS AND MAINTAINS FRIENDSHIPS	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
19. ASKS FOR HELP WHEN NEEDED	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1

D. Social Acceptability	NEVER	RARELY	SOMETIMES	FREQUENTLY	ALWAYS
20. VERBALLY ABUSES OTHERS	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
21. PHYSICALLY ABUSES OTHERS	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
22. DESTROYS PROPERTY	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
23. PHYSICALLY ABUSES SELF	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
24. IS FEARFUL, CRYING, CLINGING	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
25. TAKES PROPERTY FROM OTHERS WITHOUT PERMISSION	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
26. PERFORMS REPETITIVE BEHAVIORS (pacing, rocking, making noises, etc.)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1

SPECIFIC LEVEL OF FUNCTIONING ASSESSMENT AND PHYSICAL HEALTH INVENTORY

COMMUNITY LIVING SKILLS

E. Activities	TOTALLY SELF-SUFFICIENT	NEEDS VERBAL ADVICE OR GUIDANCE	NEEDS SOME PHYSICAL HELP OR ASSISTANCE	NEEDS SUBSTANTIAL HELP	TOTALLY DEPENDENT
27. HOUSEHOLD RESPONSIBILITIES (house cleaning, cooking, washing clothes, etc.)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
28. SHOPPING (selection of items, choice of stores, payment at register)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
29. HANDLING PERSONAL FINANCES (budgeting, paying bills)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
30. USE OF TELEPHONE (getting number, dialing, speaking, listening)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
31. TRAVELING FROM RESIDENCE WITHOUT GETTING LOST	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
32. USE OF PUBLIC TRANSPORTATION (selecting route, using timetable, paying fares, making transfers)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
33. USE OF LEISURE TIME (reading, visiting friends, listening to music, etc.)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
34. RECOGNIZING AND AVOIDING COMMON DANGERS (traffic safety, fire safety, etc.)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
35. SELF-MEDICATION (understanding purpose, taking as prescribed, recognizing side effects)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
36. USE OF MEDICAL AND OTHER COMMUNITY SERVICES (knowing who to contact, how, and when to use)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
37. BASIC READING, WRITING AND ARITHMETIC (enough for daily needs)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1

SPECIFIC LEVEL OF FUNCTIONING ASSESSMENT AND PHYSICAL HEALTH INVENTORY

F. Work Skills	HIGHLY TYPICAL OF THIS PERSON	GENERALLY TYPICAL OF THIS PERSON	SOMEWHAT TYPICAL OF THIS PERSON	GENERALLY UNTYPICAL OF THIS PERSON	HIGHLY UNTYPICAL OF THIS PERSON
38. HAS EMPLOYABLE SKILLS	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
39. WORKS WITH MINIMAL SUPERVISION	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
40. IS ABLE TO SUSTAIN WORK EFFORTS (not easily distracted; can work under stress)	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
41. APPEARS AT APPOINTMENTS ON TIME	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
42. FOLLOWS VERBAL INSTRUCTIONS ACCURATELY	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
43. COMPLETES ASSIGNED TASKS	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1

OTHER INFORMATION

44. From your knowledge of this person, are there other skills or problem areas not covered on this form that are important to this person's ability to function independently? Is so, please specify.

_____

_____

45. How well do you know the skills and behavior of the person you just rated? (Check one)

VERY WELL		FAIRLY WELL		NOT VERY WELL AT ALL
☐ 5	☐ 4	☐ 3	☐ 2	☐ 1

46. Have you discussed this assessment with the individual? (Check one)

☐ Yes ☐ No

If YES, does the individual generally agree with the assessment? (Check one)

☐ Yes ☐ No

If NO, please comment

_____

_____

Signature of Rater: _____

State of Illinois Department of Human Services

SPECIFIC LEVEL OF FUNCTIONING ASSESSMENT AND PHYSICAL HEALTH INVENTORY

PHYSICAL HEALTH INVENTORY

Instructions:
Place an "X" in all boxes which describe this individual

PHYSICAL HEALTH

Current Physical Health Problem of the Individual

- ☐ None
- ☐ Arteriosclerotic Heart Disease (ASHD)
- ☐ Hypertension
- ☐ Other Circulatory Disorder
- ☐ Serious Respiratory Disorder
- ☐ Diabetes
- ☐ Obesity
- ☐ Arthritis
- ☐ Decubitis Ulcer (Bedsores)
- ☐ Seizure Disorder (Epilepsy)
- ☐ Gastro-Intestinal Disorder
- ☐ Organic Brain Syndrome
- ☐ CVA-Stroke
- ☐ Vision Limited
- ☐ Blind
- ☐ Hearing Impaired
- ☐ Speech Impaired
- ☐ Fracture
- ☐ Urogenital Disorder
- ☐ Huntington's Disease
- ☐ Alzheimer's Disease
- ☐ Parkinson's Disease
- ☐ Tardive Dyskinesia
- ☐ Cancer of a Major Organ or System
- ☐ Other

Physical Health Aids Used or Required by the Individual

- ☐ None
- ☐ Eyeglasses
- ☐ Hearing Aid
- ☐ Dentures
- ☐ Other

Skilled Nursing Procedures Required by the Individual

- ☐ None
- ☐ Daily Vital Signs
- ☐ Insulin Injection
- ☐ Preventive Care for Pressure Sores
- ☐ Treatment for Decubitus Ulcers
- ☐ Catheter/Ostomy Care
- ☐ Aseptic Dressing
- ☐ Physiotherapy
- ☐ Continence Training
- ☐ Lesion Irrigation
- ☐ Suctioning
- ☐ Inhalation Therapy
- ☐ I.V. Feeding Fluids
- ☐ Tube Feeding
- ☐ Others

Incontinence of Urine:

- ☐ Never
- ☐ Night Only
- ☐ Less than Once a Day
- ☐ 1-3 Times a Day
- ☐ More than 3 times a Day
- ☐ Uses Catheter

Incontinence of Feces:

- ☐ Never
- ☐ Less Than Once a Day
- ☐ More Than Once a Day
- ☐ Once a Day
- ☐ Has a Colostomy

Which of the following best describes the individual's ability to walk:

- ☐ Fully Independent
- ☐ Unsteady
- ☐ Uses Cane or Walker
- ☐ Walks Only with Staff Assistance

Uses Wheel Chair

- ☐ Independently
- ☐ Must be Pushed
- ☐ Chair Fast or Needs Possy Support
- ☐ Bed Fast

Personal Care Activities

	Fully Independent	Needs Reminders	Needs Supervision	Some Physical Assist.	Needs Much Physical Assist.	Needs Total Care
Bathing	☐	☐	☐	☐	☐	☐
Dressing	☐	☐	☐	☐	☐	☐
Grooming	☐	☐	☐	☐	☐	☐
Eating	☐	☐	☐	☐	☐	☐
Using Toilet	☐	☐	☐	☐	☐	☐

Comments: (Note and explain areas which require evaluation to determine the amount of physical care this individual requires)

_____

_____

_____

_____

_____

Rater Signature: _____

Rater Title: _____

Date: _____

PROCEDURE

- An approval from the ethical committee, permission from the institutional head and consent from the patients and caregivers were attained.
- Samples were screened using Scale for the Assessment of Negative Symptoms (SANS), all patients who scored above 30 in SANS were selected.
- A pretest was performed for the target population using SLOF and ASP which is taken as the baseline of the patients functioning level and sensory profile.
- Patients were classified into experimental and control group, 15 patients were randomly assigned in the experimental and the control group after pretest.
- After that experimental group were provided with sensory integration therapy and cognitive remediation was provided to control group.
- Experimental group and control group underwent therapy for 24 sessions with duration of 45min to 1hour for three days in a week.
- After completion of 24 sessions, both the group underwent post-test using SANS, SLOF and ASP.
- The data collected were analyzed.

INTERVENTION:

SENSORY INTEGRATION:

- Activities were selected by the therapist. Activities were aimed to provide patients with vestibular, proprioceptive, tactile, visual and auditory input.
- Each activity was given for three days and the activities were graded from simple to complex based on the patient's progression. Eg: Balloon activity- it was graded from one balloon to two balloons and sometimes water or sand would be added inside the balloon.
- Initially the activities were demonstrated by the therapist to the patient and also a brief idea about the purpose of the activity was explained to the patient.
- The activities given are as follows,

1. Finding objects in a box of plastic foam beads
2. Wheelchair activity
3. Tug of war

4. Balloon activity
5. Walking in different patterns
6. Facial expression
7. Ball games
8. Writing activity

COGNITIVE REMEDIATION THERAPY:

- Activities were provided in following order

ACTIVITY	WEEK ADMINISTERED
Number connection	Week 1-3
Letter symbol substitution	Week 1-2
Grain sorting	Week 1-4
Rearrangement of jumbled words	Week 3-4
Design fluency	Week 3-4
Word generation	Week 4
Design colouring	Week 1-6
Maze completion task	Week 6-8
Short essay writing	Week 8
Letter cancellation task	Week 4-7

MASTER CHART

EXPERIMENTAL GROUP

Name	AGE	SANS		SLOF		ASP-low registration		ASP-sen. Seeking		ASP-sen. Sensitivity		Sen. Avoidance	
		PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Lakshmi	55	82	55	128	169	60	42	27	31	31	28	45	38
kumar	32	100	78	129	167	54	39	34	42	38	36	38	37
salim	45	100	69	157	182	37	33	42	48	42	36	47	44
raja	40	76	45	101	144	62	42	23	38	34	35	39	27
arunkumar	45	84	51	156	193	40	26	40	46	40	32	48	35
anand	54	84	59	134	165	29	22	42	48	32	34	40	37
daniel	36	97	85	127	172	66	47	31	36	40	38	49	46
meghala	37	99	72	112	158	50	35	35	40	39	31	36	33
sathish	32	96	70	97	146	58	41	44	26	38	35	39	35
priya	25	96	75	113	162	61	47	35	33	39	33	40	39
krishna	29	103	87	124	157	55	40	33	37	35	34	46	40
ram	40	93	85	105	129	61	49	25	31	38	41	33	27
sharon	30	84	55	173	199	47	36	35	41	36	35	50	42
govind	57	93	68	99	125	62	45	34	38	37	34	46	44
amith	28	80	63	125	146	52	42	33	35	30	29	46	36

CONTROL GROUP

Name	AGE	SANS		SLOF		ASP-low registration		ASP-sen. Seeking		ASP-sen. Sensitivity		Sen. Avoidance	
		PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
malarvizhi	40	108	90	119	136	51	49	26	32	30	27	29	28
jaykumar	41	78	69	171	190	59	56	30	29	31	30	38	37
sathish	37	75	65	148	171	24	21	53	51	30	23	46	42
manikanda	48	102	95	113	133	40	38	42	44	34	30	36	33
srinivasan	40	68	66	167	174	58	53	37	31	42	40	30	34
gomathi	35	103	86	139	130	35	31	46	48	51	55	48	44
raghul	27	96	83	130	157	44	39	29	30	40	33	37	37
vanitha	28	100	85	129	150	66	62	38	40	39	37	42	42
muthuraj	34	104	92	129	132	65	60	29	30	32	29	37	39
reena	40	92	86	156	163	58	57	23	24	34	32	51	44
santhamar	46	121	112	85	102	69	60	24	25	44	43	45	42
vignesh	24	101	90	132	141	58	56	29	34	32	30	48	45
ragav	44	79	66	140	159	43	50	36	31	35	32	30	29
veena	32	95	82	128	133	71	65	34	34	46	41	57	51
vasanth	32	95	75	133	149	59	57	31	34	38	33	46	40

KMCH ETHICS COMMITTEE
KOVAI MEDICAL CENTER AND HOSPITAL LIMITED

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E-mail : ethics@kmchhospitals.com
EC Reg. No : ECR / 112 / Inst / TN / 2013

Ref: EC/AP/557/08/2017
23.08.2017

APPROVED

To

Dr.D. Srinivasan,
Head of the Department,
Consultant – psychiatrist,
Kovai Medical Center and Hospital,
Coimbatore-641 014,
Tamilnadu, India.

Dear Dr.D. Srinivasan,

The proposal entitled **"Effectiveness of Sensory Integration to Reduce Negative Symptoms and to Improve Functional Abilities in Schizophrenic Patients"** submitted by **Mr.R. Bhuvanesh** under your supervision was reviewed by the Ethics Committee in its meeting held on **05.08.2017** and permission is granted to carry out the study at **Kovai Medical Center and Hospital Ltd, Coimbatore, India.**

Thanking you,

Yours faithfully,

23/8/17

Dr. P. R. Muthuswamy,
Chairman, KMCH Ethics Committee

Dr. P. R. MUTHUSWAMY,
MA.,MEA. FDPM(IIM-A)Ph.D.,
Chairman
Ethics Committee
Kovai Medical Center and Hospital
Avanashi Road,
COIMBATORE-641 014.

KMCH ETHICS COMMITTEE
KOVAI MEDICAL CENTER AND HOSPITAL LIMITED

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KMCH ETHICS COMMITTEE MEMBERS LIST

S. NO	MEMBER NAME	DESIGNATION	REPRESENTATION	DESIGNATION TO THE INSTITUTION	GENDER
1.	Dr.P.R.Muthuswamy	Principal, Dr.N.G.P Arts & Science College	Chairperson	Chairperson, KMCH Ethics Committee	M
2	Dr. Devdas Madhavan	Consultant Urologist	Member Secretary	Consultant Urologist	M
3	Dr. V.Rajamani	Consultant Rheumatologist & Physician	Clinician	Consultant Rheumatologist & Physician	M
4	Dr.K.Senthilkumar	MD-Pharmacology Pharmacologist	Basic Medical Scientist	None	M
5	Dr. A.N.Murugan	Medical Director	Clinician	Medical Director	M
6	Dr. Sangita S.Mehta	Consultant Pathologist	Clinician	Consultant Pathologist	F
7	Dr. S.Madhavi	Principal	Member	Principal, KMCH college of Nursing	F
8	Dr. K.S.G.Arul Kumaran	Professor	Basic Medical Scientist	Professor, KMCH college of Pharmacy	M
9	Dr. S.Thamil Selvi	Social Worker	Social worker	None	F
10	Mr. C.Tamil Selvan	VP-Materials	convener	VP-Materials	M
11	Mr. T.C.Dinamani	Advocate	Legal Expert	Personnel Manager	M
12	Mr.R.Krishnamoorthy	Priest	Theologist	Priest	M
13	Mr. D.Ramanathan	Office Assistant	Lay person	Office Assistant	M

23/8/17

Dr. P. R. Muthuswamy,
Chairman, Ethics Committee

Dr. P. R. MUTHUSWAMY,
MA.,MBA.,FDPM(IIM-A)Ph.D.,
Chairman
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29th August, 2017

Ref: RC/007/2017

To

Dr.D.Srinivasan,
Head of the Department,
Consultant – Psychiatrist,
Kovai Medical Center and Hospital,
Coimbatore-641014,
Tamilnadu, India.

Dear Dr. D.Srinivasan,

The dissertation work titled **"Effectiveness of Sensory Integration to Reduce Negative Symptoms and to Improve Functional Abilities in Schizophrenic Patients"** presented by **Mr.R.Bhuvanesh,** 2nd year Master of Occupational Therapy under your guidance was discussed at Research Committee held on 05.08.2017 and unanimously decided to give permission to carry on the study at **Kovai Medical Center and Hospital Ltd, Coimbatore**, India.

Thanking you

Yours faithfully,

DR V.KUMARAN
29/08/2017
Head of the Institute/ Dean

Dr. V. KUMARAN MS., MCh.,
DEAN
Kovai Medical Center and Hospital
Coimbatore - 641 014 Tamil Nadu

Enclosure: Composition of Research Committee

EXCELLENCE IN HEALTH CARE 25 1990 - 2015

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KMCH RESEARCH COMMITTEE MEMBERS LIST

S:NO	NAME	DESIGNATION
1	Dr.V.Kumaran	Head of the Institute/Dean
2	Dr. D.Srinivasan	Guide
3	Dr.Deepak.T	Basic Science Faculty
4	Dr.V.Ganesh	Statistician
5	Dr.Pankaj Mehta	Member
6	Dr.Arul Selvan.V	Member
7	Dr.K.S.Rajkumar	Member
8	Dr.N.Selvarajan	Member
9	Dr.Rajendran.K	Member

DR.V.KUMARAN
29/08/2017

Head of the Institute/Dean

Dr. V. KUMARAN MS., MCh.,
DEAN
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Coimbatore - 641 014 Tamil Nadu

EXCELLENCE IN HEALTH CARE 25 1990 - 2015

KMCH COLLEGE OF OCCUPATIONAL THERAPY

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September 8, 2017

To

THE CHAIRMAN,

NAVEEN HOSPITAL

Respected Sir / Madam,

Sub: Permission to conduct a study.

* * *

I would like to bring to your kind notice that one of our M.O.T student **Mr.R.Bhuvanesh** of II year, is doing a project title **"Effectiveness of Sensory Integration to Reduce Negative Symptoms in Patients with Schizophrenia"** Therefore, I request you to kindly grant him permission to do the study.

Thanking You,

Yours Sincerely,

Mrs. Sujata Missal, M.Sc (OT).,
Principal.

The Principal
KMCH College of Occupational Therapy
KMCH Campus, Avinashi Road,
Coimbatore - 641 014.

Administrative Office :
No.940/1A&B, Kovai Estate, Kalapatti Road, Coimbatore - 641 048. INDIA
Ph : (0422) 2369300, 2369321 Fax No : 2627196
E-mail : info@kmch.ac.in website : www.kmch.ac.in

Permission Granted

NAVEEN HOSPITAL,
Raja Nagar, Behind Ver Hospital,
Trichy Road, Coimbatore - 641 028.

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September 8, 2017

To

Dr. Ravishenkar,
Krishna Nursing Home

Respected Sir / Madam,

Sub: Permission to conduct a study.

* * *

I would like to bring to your kind notice that one of our M.O.T student **Mr.R.Bhuvanesh** of II year, is doing a project title **"Effectiveness of Sensory Integration to Reduce Negative Symptoms in Patients with Schizophrenia"** Therefore, I request you to kindly grant him permission to do the study.

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The Principal
KMCH College of Occupational Therapy
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Ph : (0422) 2369300, 2369321 Fax No : 2627196
E-mail : info@kmch.ac.in website : www.kmch.ac.in

Permitted

DR. B.RAVI SHANKAR
CONSULTANT PSYCHIATRIST
Reg No: 58791

KMCH COLLEGE OF OCCUPATIONAL THERAPY

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September 8, 2017

To

THE CHAIRMAN,

KONGU NADU MANALA ARAKATTALI

Respected Sir / Madam,

Sub: Permission to conduct a study.

* * *

I would like to bring to your kind notice that one of our M.O.T student **Mr.R.Bhuvanesh** of II year, is doing a project title **"Effectiveness of Sensory Integration to Reduce Negative Symptoms in Patients with Schizophrenia"**

Therefore, I request you to kindly grant him permission to do the study.

Thanking You,

Yours Sincerely,

Mrs. Sujata Missal, M.Sc (OT).,
Principal.

The Principal
KMCH College of Occupational Therapy
KMCH Campus, Avinashi Road,
Coimbatore - 641 014.

Student may come in person and discuss the project details, background of study and proforma if any. He is required to sign on agreement before starting the study

13 SEP 2017

Procedure -
- details of cog rehabilitation - No papers
- details sensory integration
- No of pts
- No sessions -
Proforma - all hard copy.

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